

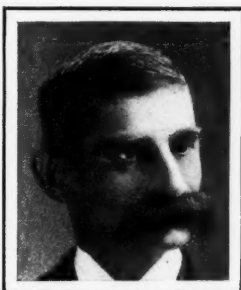
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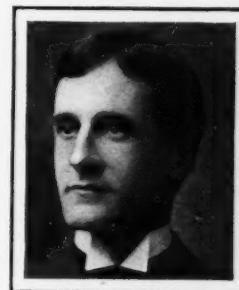


EX-MAYOR HAYES

BALTIMORE: The Gate City of the South

**The Next Meeting Place of the League of American
Municipalities—Commercially Prosperous and
Progressive in Its Municipal Policies**

By the Editor



MAYOR McLANE

VOLUMES could be written about the history and romance of Baltimore, but our readers would not be so much interested in them as in a plain description of the municipal characteristics; they want to know why it is "a city without graft" and learn something about the municipal machinery which makes such a desirable condition possible.

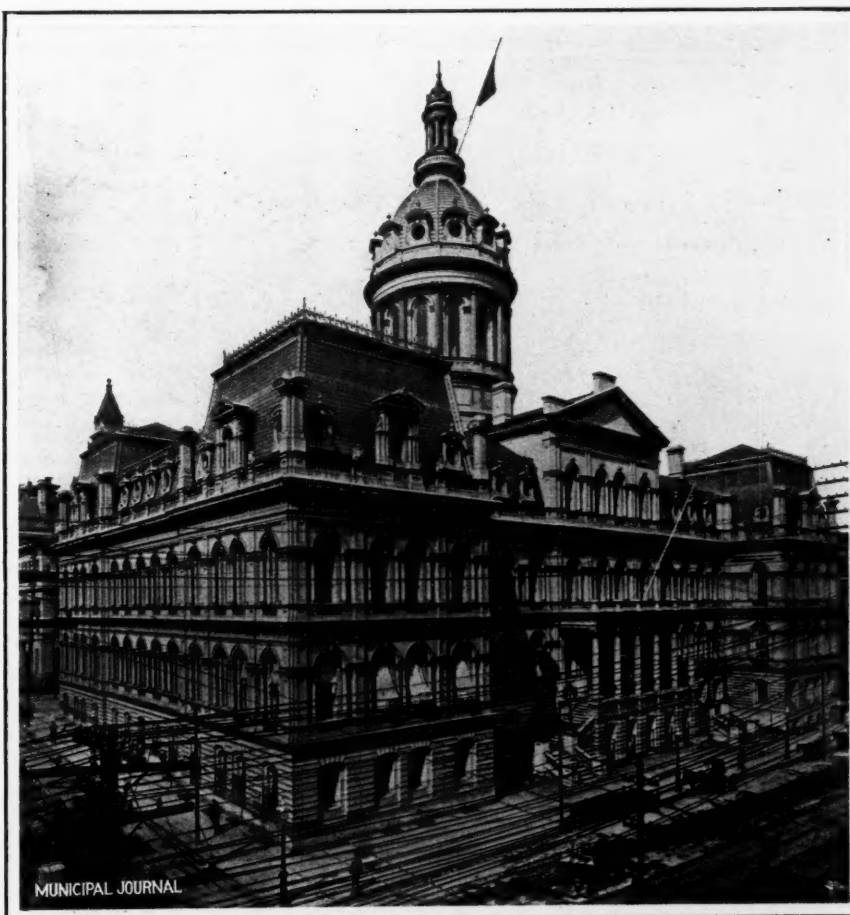
THE WORK OF FORMER MAYOR HAYES

The city has not always borne so good a reputation; like other great civic corporations, it has had its periods of corruption and reform. None of the latter have been more satisfactory than that under the new charter. It is a matter for the city's congratulation that a man of the vigorous and uncompromising type of former Mayor Thomas G. Hayes was called upon to interpret and put into practice the provisions of the new charter. It would be difficult to estimate the amount of good which has resulted to other municipalities in the United States from the example afforded by the city of Baltimore in discarding corrupt methods of administration

and cleaving unto that which is good, thus earning for itself the right to be called "the city without graft." How this result has been achieved is too well known to bear repetition here. Those

outside who have been keeping an eye on Baltimore have had a fear that the achievements of the administration of Mayor Hayes might be dissipated by his successor.

This fear, however, is groundless, as the present incumbent, Mr. Robert M. McLane, is a worthy successor and one upon whom the citizens of Baltimore may rely for the faithful performance of every duty. Although Mr. McLane is the youngest mayor the city ever had and probably the youngest mayor of any city of size in the United States, he has had a training which has made him a man of affairs, distinguished for his good judgment, aggressiveness, and fidelity. While his public career has necessarily been short, his experience as assistant and afterward State's Attorney, coupled with a naturally cool and deliberate judgment,



BALTIMORE'S CITY HALL

has fitted him to faithfully discharge the duties of the chief executive of so important a city.

THE NEW CHARTER THE BACKBONE OF THE REFORM

The new city charter has furnished the foundation for the reform, and no matter how good a man may have been or how well equipped for his office, he would have been powerless had he not been strengthened by such a charter. This instrument provides for a mayor, who is elected every four years, and a city council of two branches, chosen from the twenty-two wards into which the city is divided. The first branch consists of twenty-two members, one from each ward, elected biennially; the second, of a president and eight other members, two from each of the four councilmanic districts into which the city is divided, elected every four years.

There are five administrative departments: that relating to finance is composed of the Comptroller, City Register, Board of Estimate, Commissioner of Finance, City Collector, Collector of Water Rents and Licenses. The Department of Law is under the direction of the City Solicitor. The Board of Fire Commissioners, Commissioners of Health, Inspector of Buildings and Commissioner of Street Cleaning constitute the Department of Public Safety. In the Department of Public Improvements are grouped the City Engineer, Water Board, Harbor Board, and Inspector of Buildings. The Department of Review and Assessment includes the Appeal Tax Court, Commissioners for Opening Streets, Board of Park Commissioners and Board of School Commissioners.

The City Hall is a notable public building and quite well adapted to its use when it is remembered that it was built in 1875. It is large enough to house the majority of the departments and bureaus of the municipal government. It is a striking specimen of Renaissance architecture and occupies the entire block, covering an area of 30,552 square feet.

The building contains one hundred and two rooms, well lighted and ventilated. Visitors from Cleveland, Detroit, and some other cities, where the city halls are notoriously dirty, would be immediately impressed with the immaculate cleanliness which prevails throughout the City Hall. This characteristic will attract quite as much attention when the members of the League of American Municipalities convene in Baltimore, in October, as any other

taining in Baltimore, in which he emphasized the fact that Baltimore was "a city without graft," the mayor of an enterprising city came out with a long article extolling his own municipality to the skies and holding it up as an example of the same sort. But the old



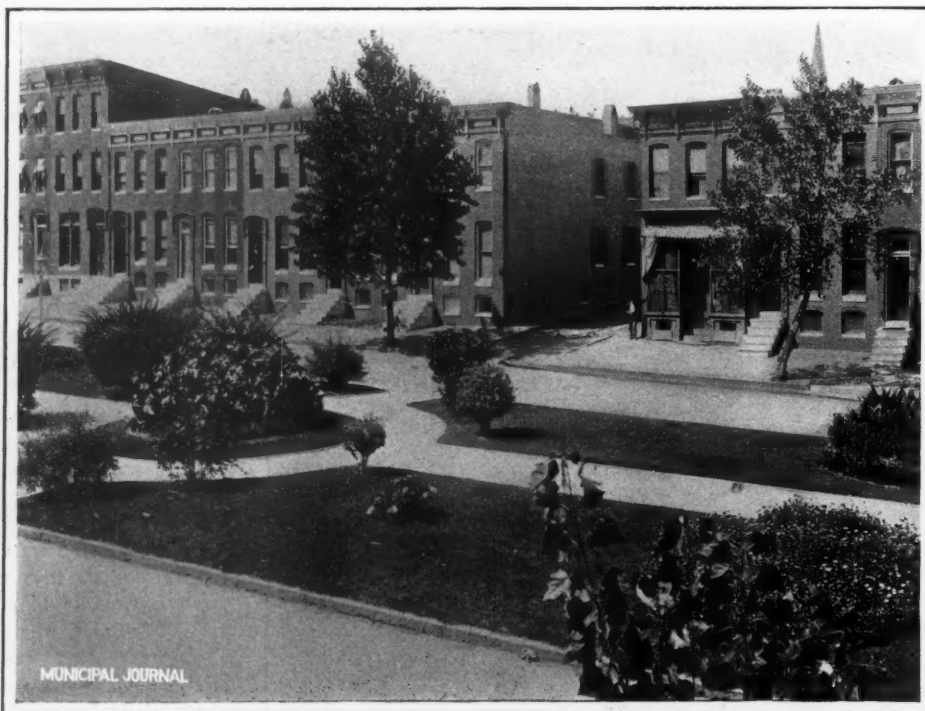
A KELLY ROAD ROLLER AT WORK ON MACADAM

proverb, "Pride goeth before a fall," was never more emphatically emphasized than in this particular case, as within two weeks after the publication of his article, a most distressing instance of civic "graft" was made public.

MUNICIPAL SOCIALISM HAS TAKEN ROOT IN BALTIMORE

There is quite a strong socialistic element of the Tom Johnson-Golden Rule Jones order in Baltimore. Its leaders have not equalled the pace set by Johnson and Jones, of Cleveland and Toledo. But, nevertheless, it is an element which is vigorously asking for all that has been justly due the city from private corporations, as the street railway, electric light and gas companies. Foremost in this reform has been Mr. George Stewart Brown, of the second branch of the City Council. For four years Mr. Brown has been fighting in the Council along these general lines, and at the spring primary and election won out in a campaign conducted wholly upon his record. The fact that he was opposed by all the political machines and yet won the fight is sufficient cause for reference to this phase of Baltimore's civic life. Mr. Brown had served two years as a member of the Council of the First Branch, and had always been fearless and aggressive in not only defending the city's rights, but attacking any corporation which he thought was receiving more from the city than its just deserts.

The platform upon which he conducted his campaign, and which was circulated through the mail, called attention to the fact that it was the passage of his resolution providing for a commission to consider the establishment of a municipal light plant which had resulted in the concession in arc lighting, valued at \$40,000 a year, to the city; that it was through his efforts that the United Railway Curve ordinance was secured, resulting in a reaffirmation



PARKWAY EFFECT ON A BALTIMORE STREET—SHEET ASPHALT PAVEMENT IN FORE- AND BACKGROUND

feature of this imposing structure, even though on general principles it may appear trifling.

It is interesting to note, just at this point, that not long after the appearance of Mayor Hayes' excellent article on the conditions ob-

of the city's right to purchase certain tramway franchises every fifteen years; that it was his amendment providing for the sale of the Western Maryland Railroad which reserved and saved to the city \$280,000 of sinking funds which otherwise would have gone

to the purchaser of the road; that it was his amendment to the hot and cold air company's franchise granting, which would be the precedent for the taxation, like real estate, of future franchise grants in public streets after the manner of the Ford Franchise Tax Law

ninety-five. It will cost millions to perfect the sanitary sewer system, and more millions to perfect the streets of Baltimore before she can claim the right to be called a well-paved city.

But the present condition of Baltimore's streets is no fault of the

engineering department; it is rather due to local conditions and lack of adequate appropriations to bring about the needed improvements. There is no better organized or equipped engineering department in the country than can be found in Baltimore under the efficient administration of City Engineer Fendall. Here is another instance of the wise provisions of the Baltimore charter. The city engineer is unhampered by a lot of red tape, as is usually found in other cities. For instance, he is authorized to employ or dismiss all members of the department. This provision enables him to obtain a better degree of discipline than can be found in those departments which are hampered with the petty red tape-ism of officialdom. The head of this department is placed in command because of his fitness for the position, and he is held responsible for the work committed to his care.

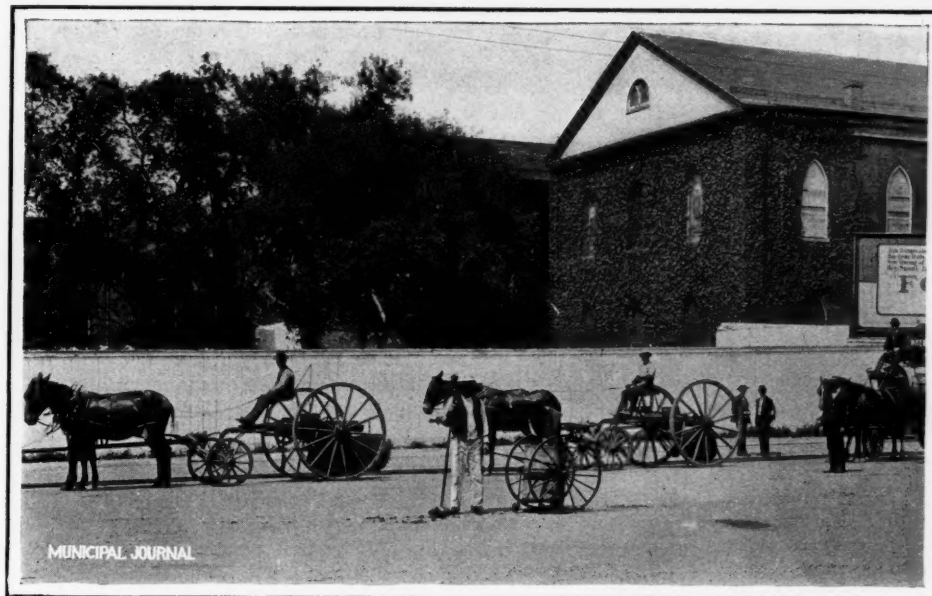
AN EXCELLENT ENGINEERING DEPARTMENT

The city engineer has three assistants, each in charge of a special branch of the work, reporting at regular intervals to the

head of the department. They are of equal rank and receive the same compensation. One assistant is in charge of the sewers; another, bridges and new paving, and the third is in charge of a subdivision of street repairs.

The office or clerical force is in charge of a chief clerk and paymaster. It is his duty to supervise the auditing of all bills, pay rolls and accounts, requisitions for men and material and permits issued. All members of his force report to him, he in turn reporting to the city engineer.

It is interesting to note that all specifications are approved, bids invited, and contracts let by the Board of Awards, the law requiring

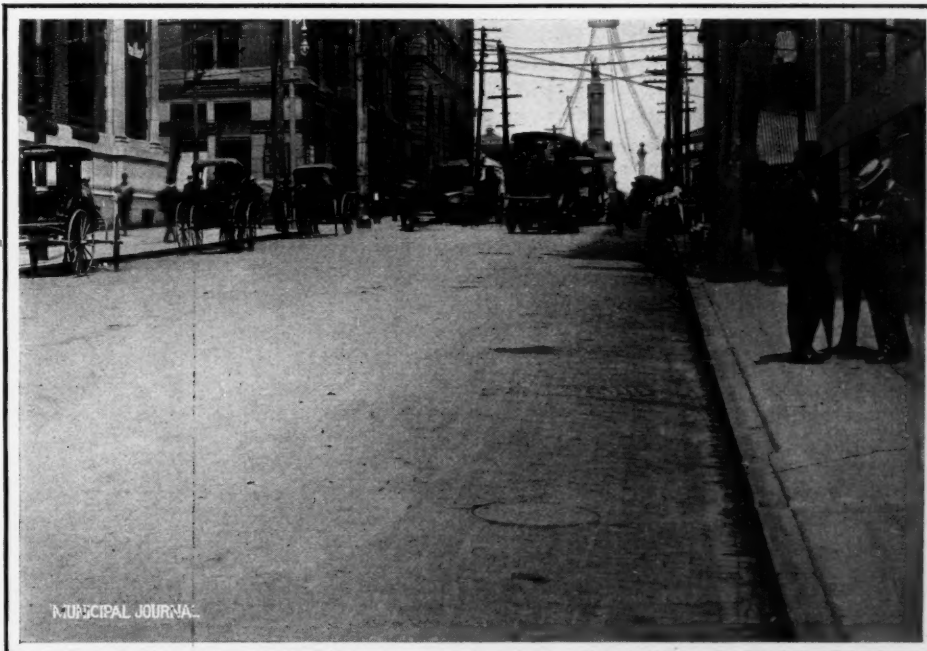


HORSE AND HAND SWEEPERS AND SPRINKLING CART—PART OF BALTIMORE'S STREET SWEEPING OUTFIT—See page 131.

of New York State. Although Mr. Brown is often referred to as "a crank," the fact that he was successful in the primaries upon a platform in direct opposition to the regular party organization and in a large district comprising one-fourth of the city, followed by his election with a handsome majority of over 7,600, indicates that the policies which he represents have taken root in Baltimore.

TOO MUCH COBBLESTONE PAVEMENT

Compared with cities of its size, Baltimore is fairly paved, but as compared with many cities of less importance, it is one of the most poorly paved. It has fifty-one miles of unpaved streets, as compared with four hundred and thirty-two in St. Louis and ninety in Boston; of its three hundred and seventy-nine miles of paved streets, three hundred and twenty-one are of cobblestone, thirty-two of granite and Belgian block, and seventeen of asphalt and asphalt block; the remainder being paved with brick, wood block and macadam, there being less than one mile of the latter. There is only one city in the country which has a rougher pavement than can be found in Baltimore, and that is Brooklyn. The excuse which has often been given for the poor pavements which are found in Baltimore has been that the city was waiting to install a sanitary sewer system before perfecting its streets; but unless the authorities get at the proposed sanitary improvements in the near future, the present generation will have a chance to reach a good old age before the desired changes can be made in the street surface. While Baltimore has fewer unpaved streets than any of the three cities mentioned, it is by no means certain that it is better off with its three hundred and twenty-one miles of cobblestone pavement than St. Louis with none, or Boston with less than a mile. This cobblestone pavement evidently takes the place of macadam in Baltimore, for while it has less than a mile of macadam, St. Louis has two hundred and forty-nine miles, and Boston two hundred and



CREO-RESINATE WOOD PAVEMENT ON ONE OF BALTIMORE'S BUSINESS STREETS

the awarding of the contract to the lowest responsible bidder. Sand, stone, and other material for construction and repairs are received by the foreman at the point where the repairs are being made. In keeping account of these deliveries, the method is to have the con-



ONE OF BALTIMORE'S PUMPING STATIONS

tractor send two tickets, which are alike in every particular, giving the name of the contractor, place of delivery, and kind and amount of material. If the material is up to the specifications and correct as to amount, the foreman signs both tickets, returning one by the driver to the contractor and forwarding the other with his daily report to the engineer in charge. If the material does not pass inspection the foreman writes "condemned" across both tickets, and does not allow the material to be unloaded; if short as to quantity the figures on the tickets are corrected and signed for the true amount. Boxes are furnished each gang, so that the foreman may measure all material purchased by the cubic yard in case there is any doubt as to the amount, and the foreman is held to a strict accountability as to the quality and quantity of material furnished. Contractors render bills monthly, which are checked by the tickets. Certain kinds of repair work on the streets are allowed to be performed by private parties, but always under the supervision of the city engineer or his assistants. The work done by the various corporations in the way of track improvement, building electric conduits, telegraph and telephone lines, etc., is done under the direction and supervision of the city engineer. On large and important pieces of work a city inspector is always present during working hours to look after the city's interest and see that the work is done as provided by ordinance and in accordance with good practice. The cost of this inspection is charged to the corporation or individuals doing the work, a deposit to defray such expense being prerequisite to obtain a permit to proceed with the work.

No street may be paved for the first time and no macadam or cobblestone replaced with improved pavement except under ordinance. Ordinances fix the location, character of pavement, size of curb and the way the work shall be done, by day's labor or contract. The same general conditions govern the construction of sewers and bridges.

There is a defect in Baltimore, which is common in most cities, namely, the streets are not well marked. The stranger has more difficulty in getting around Baltimore than he would have in New York City for the reason that the irregular streets and avenues are not marked at intersections with street signs. In topography and arrangement of streets Baltimore is very much like Boston.

COMPARATIVELY WELL CLEANED

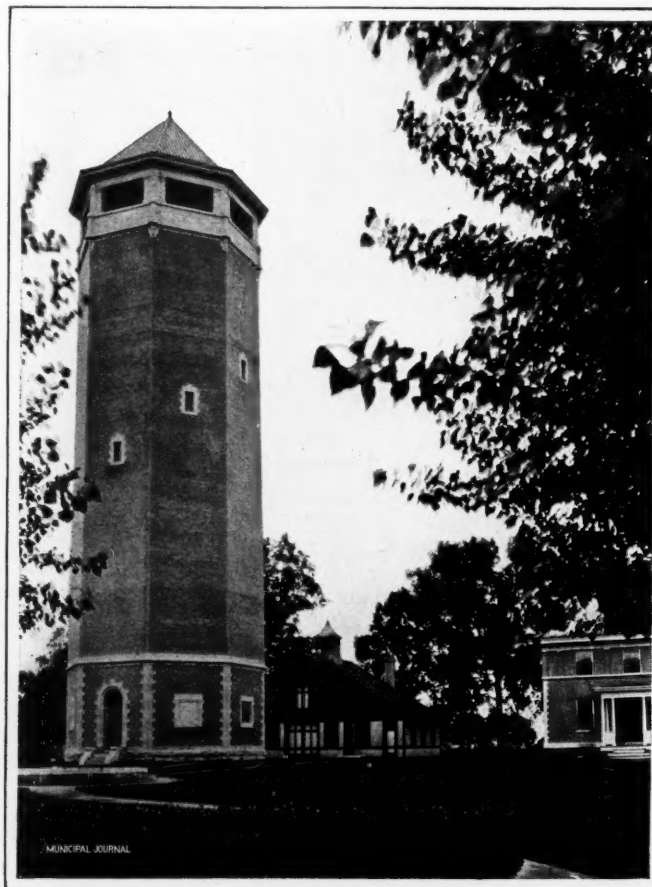
As compared with St. Louis and Boston, Baltimore has the largest death rate, it being 20.15 per thousand of population, while that of St. Louis and Boston is 17.82 and 19.7, respectively. It must be remembered, however, that Baltimore has a larger colored popula-

tion than either of the other cities and that the death rate among the colored population is always larger than among the whites. Baltimore has 15.7 per cent. colored; St. Louis, 6.2 per cent.; and Boston, 2.3 per cent., which would more than make up the difference in the death rate.

All things considered, Baltimore is a well cleaned city. The fact that it is not up to the highest standard in this respect is due to the smallness of the appropriations and also to the fact that a large number of her citizens are not careful to observe the regulations of the city calculated to produce a more cleanly condition. For example, most of the householders pay too little heed to the regulations respecting the separation of garbage and refuse. Whether their house refuse be ashes, apple parings, banana peels, water melon rinds, old flat irons, barrel hoops or what not, to them they are all one and the same thing, something in the way to be gotten rid of, and hence they thoughtlessly dump them all into one receptacle, to be gathered up by the garbage man on his rounds, although the specifications require separate receptacles for the three classes of refuse matter. The city attempts to take care of all the refuse except the garbage, which accounts, in part, for the low standard of cleanliness maintained. Better results would be obtained by either doing all the work itself, or giving a contract for the whole to one company. It is a mistake to divide the contracts for the collection and disposal of the waste of any city. The practice at home and abroad, which has secured the best results, has placed the responsibility for the collection and disposal of all classes of refuse in the hands of one concern, and it is doubtful if Baltimore will ever obtain satisfactory results in this connection until a change in the present system is made.

THE BEST REDUCTION PLANT IN THE COUNTRY

The garbage reduction plant, recently installed in the suburbs of Baltimore, is perhaps the best of its class, because it is the most recent in design and construction. The company has a ten-year contract for the collection and disposal of the city's garbage. The plant is located on an accessible water front in South Baltimore and in close proximity to railroads. The garbage is delivered both by wagons and scows, the greater part by the latter means. The



THE WATER TOWER OR STAND-PIPE

specifications require that, "all garbage, dead animals and market refuse must be within the digesting tanks, or within the process of actual disposal not later than 6 o'clock A. M. on the day following their receipt at the plant for such disposal, and this material must be completely disposed of within twenty-four hours after its collection."

There are twenty-eight 10-ton digestors, making the total capacity of the plant five hundred and sixty tons per twenty-four hours, which is much in excess of the requirements of the city. The digestors are made of five-eighth-inch open-hearth steel plates and are made to withstand a pressure of one hundred and sixty pounds. The digestors are arranged in a double row, as shown in the accompanying illustration. The garbage from the scows and the dumping platform is shoveled into a long, water-tight steel trough and conveyor, which carries it up over the tops of the digestors, each digester being connected with the trough by a separating valve, so that any one may be discontinued at will without interfering with any of the others. The reduction process, as described in the specifications, is as follows:

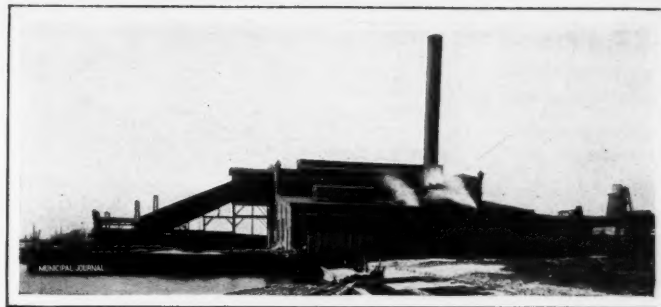


WEST END OF DRUID LAKE, ONE OF BALTIMORE'S RESERVOIRS

"The system of final disposal shall be through sterilization of all material by the use of live steam at a temperature of not less than 282 degrees Fahr., the material to be subjected to this temperature in an enclosed vessel, absolutely steam tight, at a working pressure of not less than sixty pounds per square inch, for not less than eight hours. All gases and vapors are to be drawn off and condensed. From the time the material is delivered into the said vessel it shall not be handled in the open air until after it has been pressed so that the solid part of the material shall contain moisture not exceeding 55 per cent., after which it may be finally disposed of by cremation, acidulation or reduction for use as a fertilizing material."

Four of the digestors constitute what is called a "battery," and each battery is connected with a pressing machine used for separating the liquids from the solids. The seven presses are driven by belting from an overhead shaft. The trough directly above the press is for the return of the scraper conveyor by which the press tankage is carried out of the digesting room. From the presses the liquids flow through a trough into the grease room, where, after cooling, the grease is skimmed off for use in soap manufacture and lubricating oil, while the rest of the liquid is evaporated under vacuum. After this evaporation it is known as "stick" and is mixed with the dried tankage (the solid matter) to form a fertilizer base. The tankage is carried from the press room to another part of the plant, where it receives a further treatment with phosphate and is converted into a good brand of fertilizer.

In 1901, the street cleaning department of Baltimore disposed of 21,200 tons of garbage or refuse and 42,300 tons were handled by contractors during the same year, not including ashes. Boston, by



THE GARBAGE REDUCTION PLANT

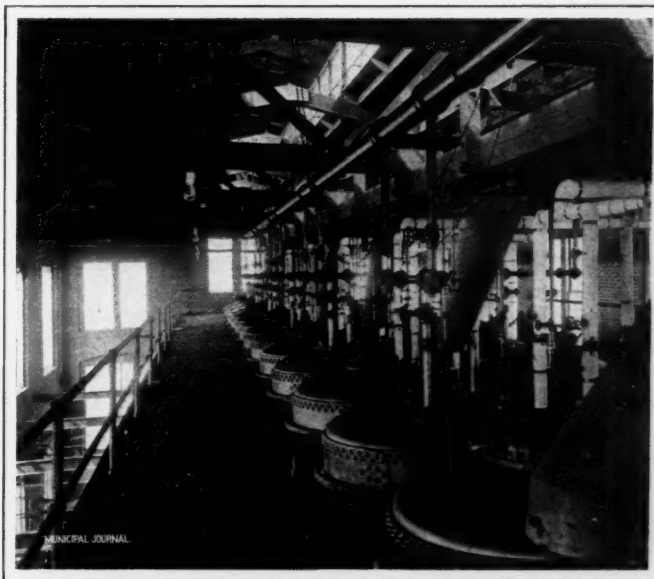
contract and otherwise, disposed of a total of 80,000 tons, while St. Louis disposed of 61,000 tons. Of the three cities, Boston is undoubtedly the most cleanly, while Baltimore will come next, and St. Louis third, although this classification is not borne out by the figures giving the aggregate number of square yards swept per week, for the year 1901, as St. Louis reports 22,500,000 square yards swept per week by hand; Boston, 10,500,000; and Baltimore, 10,055,844. Notwithstanding these figures, I believe the classification as given is correct and that it is more likely the figures from St. Louis are in error, for even the casual visitor to the three cities would say that Boston and Baltimore were much cleaner than St. Louis.

A SPLENDID ELECTRIC CONDUIT SYSTEM

Like every other large city, Baltimore is afflicted with a net work of telegraph, telephone and electric wires above ground. In 1899, however, active work was started to place the wires in underground conduits, although the authority for so doing was granted in 1892. The Legislature granted the city power to appoint an electrical commission, consisting of the mayor, city register, and president of the board of fire commissioners, which is authorized to construct underground conduits to be owned and operated by the city; the commission is also empowered to compel the removal of poles and overhead wires from such streets as may be selected by the commission.

The work has been vigorously pushed, and the original plan, as laid down by the electrical commission, cost the city \$1,000,000. Extensions are now contemplated at an additional cost of \$1,000,000, which has been appropriated after having been approved by a vote of the people at the election last November.

The rental charges vary from a minimum of five cents per foot, whether 100,000 duct feet or over are used, to a maximum of seven cents per duct foot for less than 5,000 feet. The principal companies in the city use in excess of 100,000 feet and pay the minimum rate, which includes the connection directly in the building. The companies are not, therefore, called upon to do any subsidiary con-



CHARGING FLOOR OF BALTIMORE'S REDUCTION PLANT

struction work in order to use the city conduits, as the entire connection is provided by the city, so that there is no excuse for any wires remaining upon any street or crossing over any street within the congested district.

The operation under this plan so far has been very satisfactory and without any serious disagreements between the electrical commission and the various companies interested. There has been only one case of litigation with a company, and that arose out of a contention between the city and the company, which had secured special powers with regard to the construction of underground conduits. An agreement has finally been reached, so that even this company with its special powers is now using a portion of the city conduits as supplemental to its own system, which had been built some years prior to the construction of the city conduits. In the December, 1901, issue of the MUNICIPAL JOURNAL AND ENGINEER was published an extended, illustrated article on Baltimore's conduit system, written by the chief engineer, Mr. Charles E. Phelps, Jr. When this system is completed there will be no city in the country with a better equipment for placing wires underground.

FIRE AND POLICE DEPARTMENTS

The fire and police departments of Baltimore are, in most respects, well equipped and efficiently conducted. According to the statistics gathered in 1901, Baltimore has but four hundred and eight regular firemen, as compared with St. Louis' five hundred and sixteen and Boston's seven hundred and seven. Even Cleveland, Buffalo, San Francisco, Pittsburgh, and Detroit, cities of much smaller population, have more regular firemen. In the matter of equipment with apparatus, however, Baltimore compares more favorably with cities of her size. But in the matter of fire hydrants Baltimore is sadly deficient. There is no feature of a fire department more essential to that department's efficiency than the supply of fire hydrants, and the lack of this should not be charged to the management of the fire department, but rather to the authorities higher up. St. Louis has 7,764 hydrants; Boston, 7,953; and Baltimore but 2,673. While the fact that Baltimore has a smaller area than either of the other cities mitigates, in some degree, this deficiency, there is not sufficient difference to warrant so small a number of hydrants.

Despite these facts, however, the property loss by fire in Baltimore for 1901, amounted to \$1,464,120; in Boston, \$1,830,719; in St. Louis, \$2,932,268, which is a showing very much to the credit of Baltimore. The number of fires in St. Louis was 2,063 in the year mentioned; in Boston, 2,076, and in Baltimore, 1,443.

The fire alarm telegraph system is not up to date and does not compare favorably with either St. Louis or Boston, or even cities of much smaller population and area. For example, St. Louis has 976 fire alarm boxes; Boston, 633, while Baltimore has but 447. Buffalo has 572; Cincinnati, 503; Pittsburgh, 506; and Allegheny,

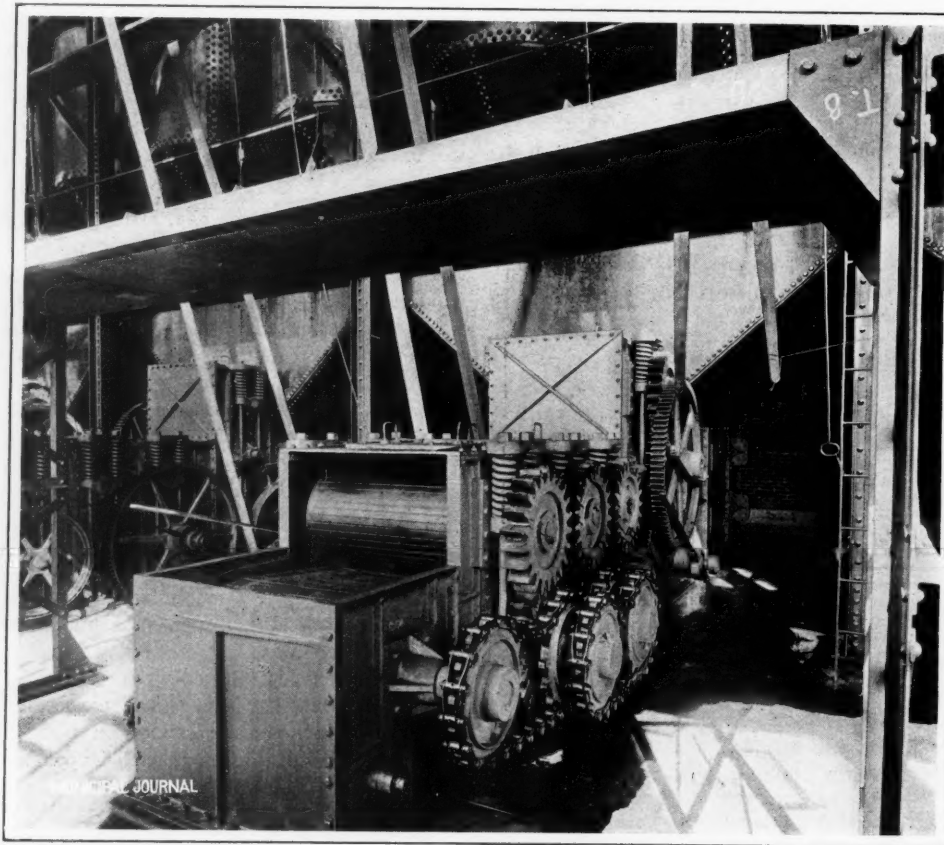
Pa., 541, all of them with a better equipment than Baltimore. For a city of the size of Baltimore there is a surprising lack of street boxes, besides which the equipment of the central office is far inferior in point of efficiency and reliability, to nearly all of the larger cities of the country. The central office is deficient in its apparatus for receiving and transmitting alarms with certainty and efficiency. To place the fire department of Baltimore upon an equal footing with cities of her size will require the installation of at least two hundred fire alarm street boxes and of an up-to-date central office equipment, not to mention the need of more men.

The police department of Baltimore is better equipped than the fire department, relatively speaking, although it has three hundred men less than either Boston or St. Louis. According to the statistics for 1901 there was a total of 31,433 arrests in Baltimore, 34,500 in Boston, and 23,666 in St. Louis. It is interesting to note that while St. Louis has 2,253 licensed retail liquor places, there were only 4,068 arrests for drunkenness, while in Boston, with 980 saloons, there were 19,511 arrests for the same cause, and in Baltimore, with

2,095 saloons, there were 10,225 arrests for drunkenness.

PARKS AND WATER SUPPLY

Baltimore has six principal parks, not to mention numerous small squares and triangles, constituting a system which compares favorably with other cities of its size. The Druid Hill Park, in former years was noted for its natural beauty, but, sad to relate, it is now suffering from over-development. The landscape gardener has destroyed the natural beauty with artificial development in the multiplicity of drives and walks. But this fault is a common one from which most city park systems have suffered. Notwithstanding this fact, the park system of



ONE OF THE ROLLER PRESSES OF BALTIMORE'S REDUCTION PLANT

Baltimore, taken as a whole, is one of which her citizens may be proud.

Baltimore has a fine system of waterworks. It was first built in 1808, and acquired by the city in 1854. Its distributing mains are 626 miles in length and the system has cost, to date, over \$15,000,000.

It has two sources of supply: the Gunpowder River and Jones' Falls. There are seven reservoirs in the system, in addition to the two impounding reservoirs, as a source of supply; Loch Raven on the Gunpowder and Lake Roland on the Jones' Falls. The total average flow from the two sources is about 178,000,000 gallons and the total storage capacity of all the reservoirs, including Loch Raven and Lake Roland, is 2,236,375,000 gallons. The average daily consumption for 1902 was 59,647,906 gallons. The department had only 1,907 meters in use on December 31, 1902. As in most other American cities, the water mains are continually being damaged by electrolysis, caused by wandering currents from the street railway system.

LACK OF A SANITARY SEWER SYSTEM

The founders of Baltimore were wiser than they realized in se-

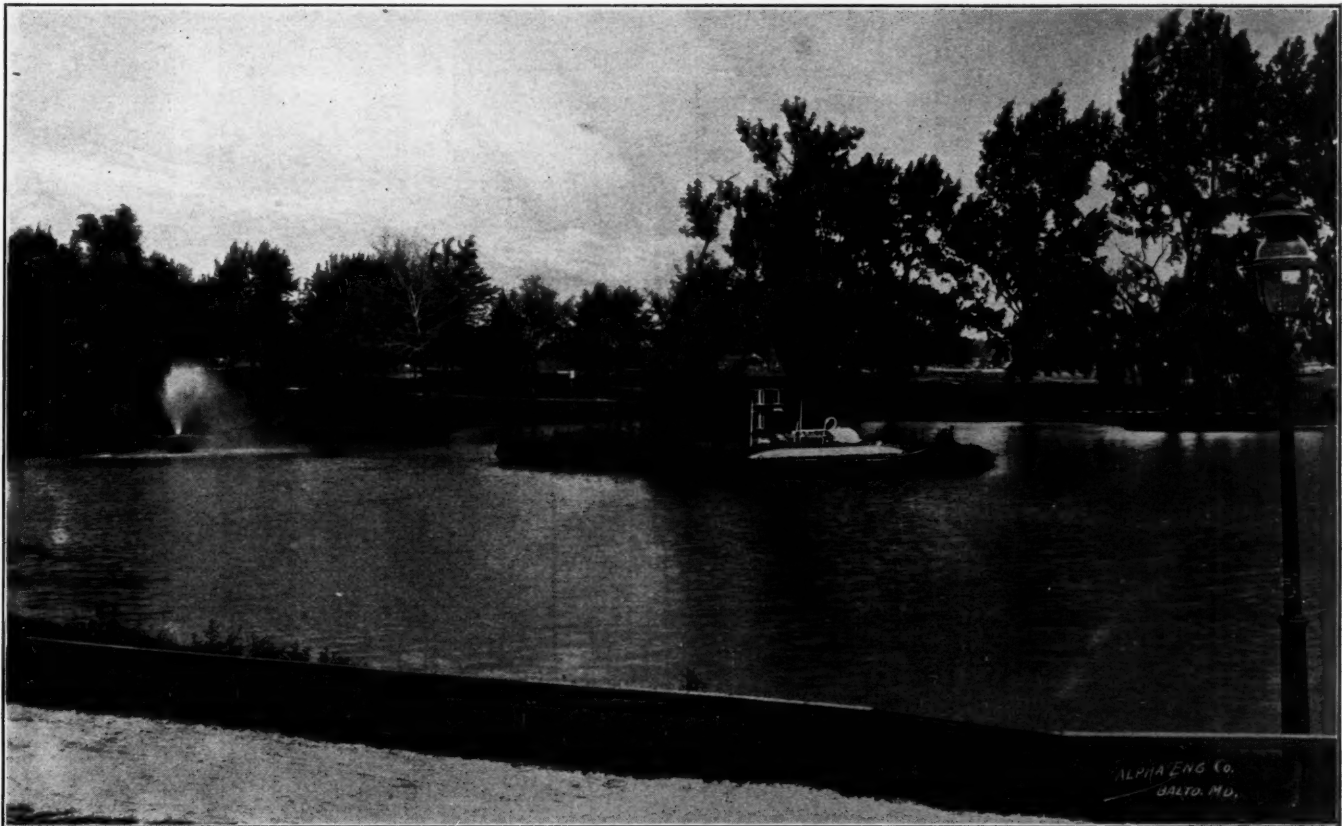
lecting a site for the future city, for, located as it is, on hills, with the aid of frequent rains and a sandy soil, it has managed to escape any serious epidemic despite the fact that it is unprotected by a sanitary sewer system. The wonder is that its death rate is not larger. If it had the low lands of New Orleans, there is no doubt that its death rate would be largely increased. As it is, its surface sewer system is little short of an abomination, and it is certainly a disgrace to a city of its size and importance.

The mayors and leading citizens have appreciated this for the past quarter of a century, and there have been exhaustive investigations touching the cost of a modern system of sewers, such as the situation demands, but up to the present time nothing further has been done. All along the subject has been made the foot-ball of the "peanut" politicians, both in the State and the city, and, as a consequence, this criminal delay has been needlessly prolonged. The fault does not lie with the intelligent and high-minded officials and

enactment of a law at the next session of the Legislature which will enable the speedy installation of a modern sanitary sewer system in this, the chief city of the South. If Mayor McLane will persist in his effort to arouse and lead public sentiment to a successful consummation of this most vital project, he will leave the most lasting monument possible to mark his administration.

UNIFORM MUNICIPAL ACCOUNTING

There is an imperative need for reform in the system of municipal accounting; a fact that has long been recognized among civic students. The question has received much consideration and study at the hands of many municipal associations, including the League of American Municipalities, the American Society for Municipal Improvements, the National Municipal League, and much progress has been made toward arriving at a satisfactory solution. There have been some notable attempts to put some of the principles evolved into practice in the cities of Boston, Chicago, New



LAKE IN PATTERSON PARK, BALTIMORE

citizens, but rather with that class of political leeches who are determined that no great improvement, no matter how much it may be needed, will be made until it suits their avaricious notions, which causes the suspicion of corruption.

In justice to the better element of Baltimore, it should be said, that at the last session of the Legislature a bill was introduced granting the city power to carry out the plans formulated by the special commission of experts some years ago, but on account of a quarrel over the personnel of the commission to be appointed to put the plans into effect, the bill was killed. It is more than regrettable that the legislator of the long-eared type is so much in the majority. Better things are expected of Maryland, as well as of Baltimore, and it is hoped that the Legislature will do something at its next session to redeem itself on this question.

Fortunately, Mayor McLane has taken a firm stand in favor of an immediate settlement of the question, and the people of Baltimore should sustain him in any movement which he, as the chief executive of the city, may initiate. The citizens of Baltimore, irrespective of party, should band themselves together now—not two, three, or six months hence—but now, and plan and work for the

York, throughout the State and municipal governments of Wyoming, and more recently in Baltimore, under the Hayes administration by Mr. James H. Smith, comptroller.

It is fortunate for the League of American Municipalities that its next meeting is to be held in Baltimore, as it will be afforded an opportunity to investigate the uniform system of municipal accounting as applied to that city and to observe the system in actual operation. In Baltimore, as in other cities, the law prevents its complete application. On this account the reform will move slowly.

Comptroller Smith, in the adoption of this system of uniform accounting, has greatly simplified the accounts of the city; in fact, has made them intelligible to the average layman. In his letter of transmittal he says:

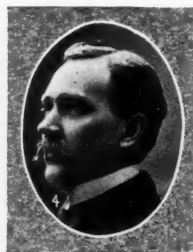
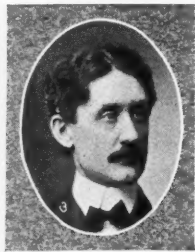
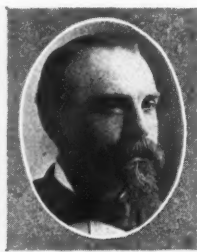
"I have the pleasure of presenting, under schedules B, the assets and liabilities of the city, together with tabulated lists, for the first time in the history of the city, showing the investments of the city in all the different classes of property controlled by it, and, in view of the necessary overhauling of incomplete departmental records, scrutiny of deeds and other matter appertaining thereto, it has delayed the issuance of this report.

"To the League of American Municipalities, who are to be with us within this year, I offer the report as a greeting, commending the adoption of the system by all members of the League, thereby enhancing its value as a medium of comparison."

The comparison of the expenditures for maintenance and operation of the various municipal departments, shows that it costs less to run the city of Baltimore than others of her class. For example, while Baltimore paid, in 1901, \$967,823 for the maintenance of the police department, St. Louis paid \$1,602,182, and Boston, \$1,754,151 for similar service. The Baltimore fire department cost for that year, \$509,763; St. Louis, \$769,272; and Boston, \$1,285,791. For public schools, Baltimore paid \$417,392; St. Louis, \$1,526,140; and Boston, \$3,043,640. For parks, Baltimore paid \$208,158; St. Louis, \$115,370; and Boston, \$419,903. The total expenditures for maintenance and operation of all the municipal departments in Baltimore in the year 1901 amounted to \$7,613,756; St. Louis, \$8,715,821; and Boston, \$21,898,291.

It is interesting to note the figures showing the assets of the various departments of Baltimore's city government. The land and buildings, apparatus, etc., of the police department are valued at \$476,297, while those of St. Louis are valued at \$218,627, and Boston, \$1,012,000; the land and buildings, apparatus, etc., of the fire department of Baltimore, Boston, and St. Louis, are \$800,997, \$2,332,000, and \$887,280, respectively; the assets of the public school system of Baltimore, Boston, and St. Louis amount to \$3,243,697, \$13,072,600, and \$6,338,352, respectively.

The comparative assets in land and buildings, books and apparatus of the libraries places Baltimore second in the list, with \$593,121 valuation, as compared with \$367,639 for St. Louis, and \$5,251,800 for Boston. Baltimore's parks are valued at \$22,153,000; Boston, \$53,275,000; and St. Louis', \$7,858,583, including land, buildings and apparatus. The total assets of the three cities are as follows: Baltimore, \$77,128,690; Boston, \$158,000,069; and St. Louis, \$52,443,955.



Officers of the League

From left to right: J. Adger Smyth, president, Charleston, S. C.; M. M. Stephens, 1st vice-pres., E. St. Louis, Ill.; R. J. Barr, 2nd vice-pres., Joliet, Ill.; J. M. Head, 3rd vice-pres., Nashville, Tenn.; Thos. P. Taylor, treasurer, Bridgeport, Conn.; John MacVicar, secretary, Des Moines, Ia.

LEAGUE OF AMERICAN MUNICIPALITIES

The Seventh Annual Convention Held at Baltimore October 7-9—Preliminary Programme and Plans for the Meeting

MORE than usual interest will center in the next meeting of the League of American Municipalities, which will be held in Baltimore from October 7th to 9th inclusive. This organization has steadily grown in public favor and usefulness during the last three years, and it has reached a stage in its development where it must do one of two things; either retrograde, or, broaden its scope and more rapidly increase its membership and facilities for carrying out its object. Mayor James M. Head, of Nashville, Tenn., seems to be the leader in a movement to broaden the lines of work of the League, which will be noticed by an article from his pen elsewhere in this issue. The changes which he suggests are exceedingly important, and if put into practice will be far reaching in their results. This proposition, together with the following programme will make the League meeting more than usually interesting:

Address of Welcome, Hon. Robert M. McLane, Mayor, Baltimore, Md.

Response, Hon. J. Adger Smyth, President, and Mayor of Charleston, S. C.

"The Advantages of Municipal Construction Over the Contract System," Hon. James M. Head, Mayor, Nashville, Tenn.

"Municipal Ownership of Public Utilities," Hon. James A. Reed, Mayor, Kansas City, Mo.

"The Initiative and Referendum," Mr. George Shibley, Chairman National Federation for Majority Rule, Washington, D. C.

"The Operation of a Municipal Asphalt Plant," Hon. John Arbutnot, Mayor, Winnipeg, Canada.

"Organized Labor and the Municipality," Hon. Ignatius A. Sullivan, Mayor, Hartford, Conn.

"Water Waste," Mr. E. W. Bemis, Superintendent of Water Works, Cleveland, Ohio.

"Municipal Telephones," Mr. J. F. Hemenway, New York City.

"Paving," A. W. Dow, Ph. B., Inspector of Asphalt and Cements, Washington, D. C.

"Municipal Statistics," Mr. Hugo S. Grosser, Municipal Statistician and Librarian, Chicago, Ill.

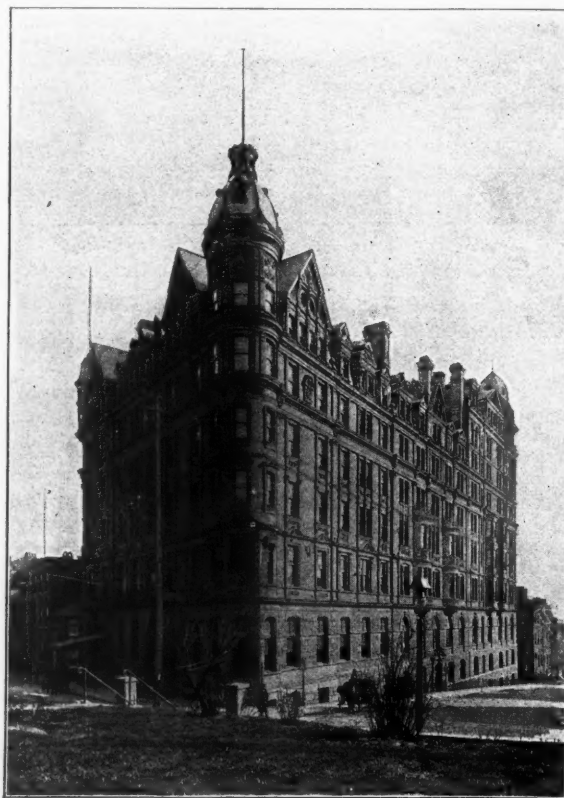
"Garbage and Sewage Disposal," Mr. Rudolph Hering, Hydraulic Engineer and Sanitary Expert, New York City.

"The Ideal City," Prof. Frank Parsons, Mt. Holly, N. J.

"Municipal Restriction of the Social Evil," Hon. Julius Fleischmann, Mayor, Cincinnati, Ohio.

Secretary MacVicar writes:

"It is expected that, in addition to the above programme, the convention will be favored by several other papers: one on "The Negative Side of Municipal Ownership," by Mr. Ernest H. Davis, Secretary of the National



HOTEL RENNERT, LEAGUE HEADQUARTERS, BALTIMORE

Electric Light Association; one on "Acetylene Gas Lighting by the Municipality," by Mr. Nelson Goodyear, New York City; an address by Hon. Chas. J. Bonaparte, President of the National Municipal League, Baltimore, Md.

Among those who have indicated an intention of being present and take part in the discussion of papers presented are the Hon. John Weaver, Mayor of Philadelphia; Hon. Samuel M. Jones, Mayor, Toledo, Ohio; Hon. Wm. M. Drennen, Mayor of Birmingham, Ala.; and Hon. L. W. Rundlett, Commissioner of Public Works, St. Paul, Minn.

This presents probably the strongest array of speakers and the most interesting group of subjects that has ever been arranged for in any of the League conventions.

Baltimore has a well earned reputation for hospitality, and is preparing to make the stay of the delegates of the League not only interesting but profitable. The special committee on entertainment, appointed by Mayor McLane, has arranged for a trip about the city in order that the delegates may see the beautiful park system, extensive water works, the new electric conduit and other works of public interest.

The city has recently made a contract with a local company to collect and dispose of its garbage for ten years, and the plant, which was completed last spring, is now in excellent running order, and will be of more than passing interest to the officials from other cities, as the garbage disposal problem is one of the unsolved questions now confronting most of our leading American cities. There is no plant which is so perfect in every part as the one now in operation in Baltimore.

It is the purpose of the city to take the delegates on an extended

boat ride down to Annapolis to see the United States Naval Academy. In fact, arrangements are being completed for a most pleasant entertainment for visiting delegates.

The headquarters of the League will be at the Hotel Rennert, which is diagonally across the street from the Y. M. C. A., where the sessions of the convention will be held. Landlord O'Connor informs us that he has accommodations for 250 guests where there are two in a room. The hotel is run only on the European plan and, therefore, the following prices do not include board: Rooms *without* bath, occupied by one person, \$1.50, \$2.00, \$2.50 and \$3.00 per day; when occupied by two persons, \$2.50, \$3.00, \$3.50 and \$4.00.

Rooms *with* bath, \$2.50, \$3.00, \$3.50, \$4.00 and \$5.00 when occupied by one person; when occupied by two persons, \$3.50, \$4.00, \$4.50, \$5.00 and \$6.00.

Suites of rooms consisting of parlor, bedroom and bath from \$7.00 to \$15.00 per day, according to location and size.

Landlord O'Connor has placed five rooms on the ground floor, suitable for the use of the committees, and the secretary's headquarters, at the disposal of the League during its session, which makes the arrangement at Baltimore most convenient.

There are several other hotels a few blocks distant from the place of meeting which will afford ample accommodation for any who are not able to secure rooms at Hotel Rennert.

Those who have already decided to attend this convention will act wisely by engaging their rooms in advance, addressing Mr. O'Connor of the hotel.

Secretary MacVicar has arranged for reduced railroad rates, and delegates should communicate with him at an early date for full particulars so that there may be no slip in securing a reduced rate.



THE MALL—DRUID HILL PARK, BALTIMORE

A SUGGESTION FOR THE LEAGUE

How to Increase Its Membership and Usefulness—Unlimited Possibilities for Its Development—The Plan Outlined

*By J. M. Head**

As a member of the American League of Municipalities I have attended every meeting of the League since my election as Mayor. Realizing that my city has been greatly benefited by the information obtained at these meetings, and feeling an earnest interest in its future success and the good it may accomplish for other cities, I take the liberty of making the following suggestions relative to its future organization and work, knowing that I can do so from a purely disinterested standpoint as I can no longer fill the office of Mayor in my city after the expiration of my present term next October.

HOW TO INCREASE THE MEMBERSHIP

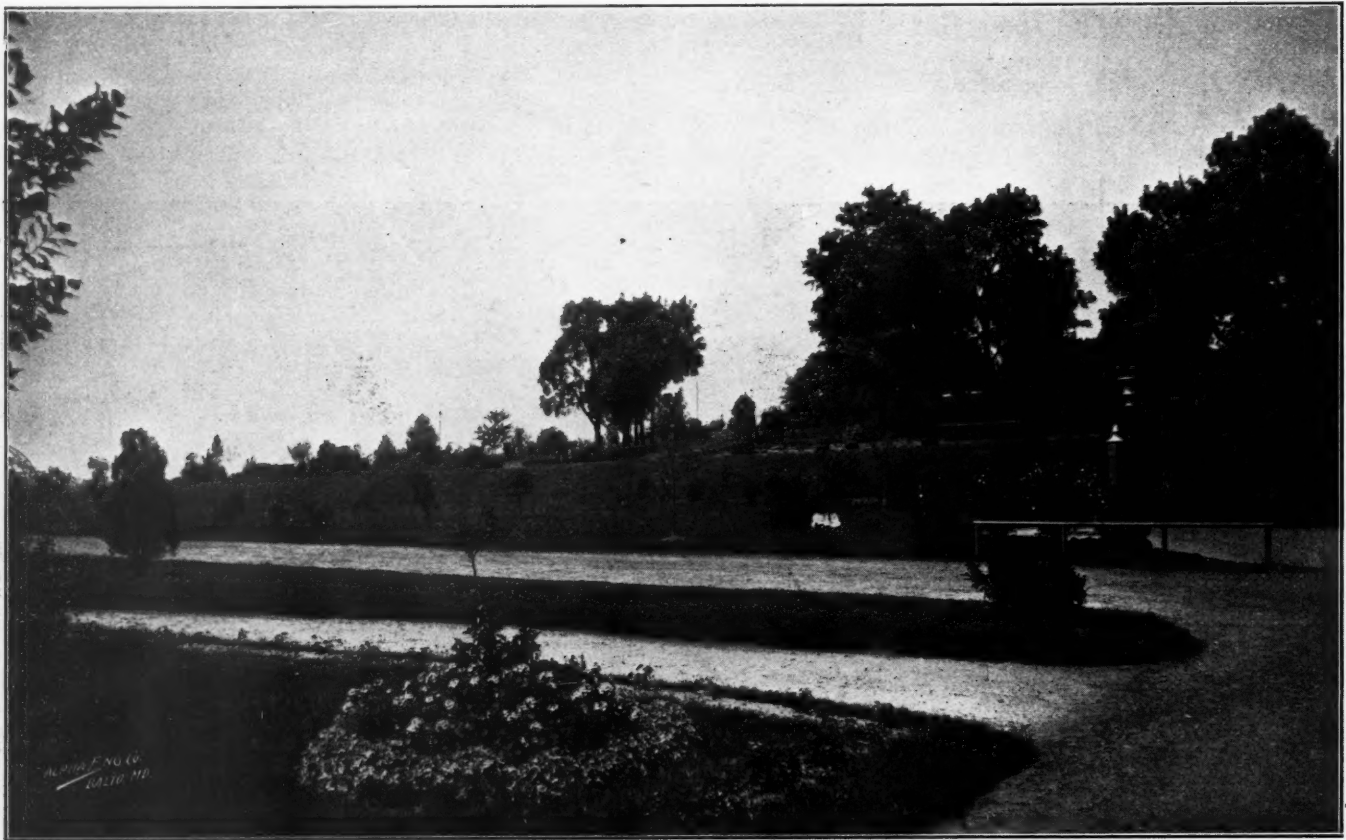
In the first place, it occurs to me that the membership of the League must be increased and that, too, from a source which will

publication in not only the trade and class journals but the leading daily papers throughout the country and so be the means of educating the general public in municipal affairs. In this way the League would become better and more widely known, which would constantly increase its membership and influence for good.

Lack of information in reference to municipal affairs is, to my mind, the real cause of inefficient municipal government and in sending out these bulletins simultaneously through the trade journals and leading daily papers, the general information thus acquired and distributed would accomplish untold good.

LONGER SESSION DESIRABLE

In the next place, the annual meeting of the League—which should cover not less than one week's time—should have a Municipal



VIEW IN CARROLL PARK, BALTIMORE

place its membership and work on a more permanent basis. City officials are constantly changing and that stability of character which is essential to the success of any organization can, in my judgment, be secured for the League by admitting to associate-membership representatives from manufacturers of street cleaning, sanitary, fire and other municipal appliances, etc., all of whom are vitally connected with the success of municipal government.

By admitting to associate-membership these representatives, the annual dues of the League may be reduced and practically the entire expense of the organization provided for. The increased revenue derived from this source would enable the League to secure a larger amount of valuable municipal data, which could be issued in bulletin form by the League secretary, and, at the same time, given out for

* Mayor of Nashville, Tenn., and Vice-President of the League.

Exhibit, and, by securing the associate-members, as indicated above, this would be made possible and this exhibit would add to rather than detract from the general work of the regular members.

There is no subject about which city officials and the public generally are more vitally interested than street paving and, by an exhibit of this kind, the representatives of asphalt, brick, wood, Medina stone, bitulithic, and other forms of pavement could be exhibited in their various stages of construction so that this feature alone could be made so valuable that it would well repay a delegation of city officials to travel across the continent to see, as they would be able to learn more during the League meeting than they could by traveling thousands of miles and spending thousands of dollars to gain the desired information from the several cities where these respective pavements have been laid. That the co-operation of these industrial

interests can be secured, there is no reasonable doubt, and as they would merely be associate-members without power to vote or to discuss questions that have merely to do with the affairs of the League, there need be no fear that such a membership could secure control of the League and thereby convert it into simply a manufacturers' show.

In my judgment, some one of the several civic organizations looking to the betterment of municipal government is going to take this step and I am exceedingly anxious for our League to take the initiative, thereby bringing to its support the co-operation of every other similar organization in the country.

As an illustration of what has been done in this line in another field, it will be sufficient to refer to the Street Railway Association. This organization began with a membership merely of street railroad officials, but it made little headway. Later it was suggested that the manufacturers of street railway cars, rails, and other supplies be taken in as associate-members and that an annual exhibit be arranged for in connection with the annual meeting of the association. This was pushed with great earnestness and that it has been successful, anyone who has attended the annual meeting of the Street Railway Association well knows. When it held a recent meeting in New York, the exhibit filled every available space of Madison Square Garden and was of such interest that fifty cents general admission was charged, and the gate receipts alone went a long way towards defraying the expenses of the meeting. It was an exhibit that attracted great interest even in the busy city of New York where people are not supposed to turn aside to visit a mere trade convention. The annual exhibit for the League of American Municipalities could certainly be made much more interesting, attractive and instructive to the general public, and especially to the city officials who have any desire to improve the conditions of their respective cities. If this were done, not only the trade papers but the daily press, would lend a hand in promoting the growth of the League in endeavoring to secure an exhibit worthy of notice.

It also occurs to me that for this general scheme to be carried out and put in practical operation, the permanent headquarters of the League should be located in the city of New York for the reason that it is the metropolitan center of the new world, and for the further reason that within its limits there are more sources of information which are readily accessible to the Secretary of the League than in all the other cities on the American continent.

GREAT SOURCES OF INFORMATION IN NEW YORK

For instance, there are over seventy-five thousand volumes in the Astor Library devoted to municipal topics, reports, etc., gathered, not only from the leading cities in the United States but also the leading cities of the world, and it is perfectly feasible for the Secretary of the League to make special arrangements with the librarian to secure access to this vast collection of information. Besides this there is the library of the Reform Club, containing more than twenty-five thousand volumes. Then there is the Tax Reform Association, dealing with that question in its various phases, besides numerous other sources of most valuable information, all of which can be made free to the Secretary's use. In addition to these sources of information, there are, no doubt, representatives in the city of New York of the manufacturers of every implement and device used by modern cities the details of which could be immediately furnished by the secretary to the representative of any city making application for information in reference thereto.

Organized upon such a basis as this, the League could well afford to employ the entire time of its Secretary, at a handsome salary, to look after its affairs and furnish immediately, upon application, any information which its members might desire.

If these suggestions meet with the approval of any considerable number of the League's officials, I shall take the necessary steps to have the matter submitted to the next meeting of the League, in Baltimore, and ask for such changes in its constitution and by-laws as may be necessary to carry them into effect.

ELECTROLYSIS IN ST. LOUIS

The Work of the Engineer Criticised, But the Facts Sustain His Findings—The Water and Gas Mains Greatly Damaged by Stray Current from Street Railway

By E. Kuichling, C. E.*

A FEW months ago an interesting report by E. E. Brownell, on an "Electrolytic Survey of the City of St. Louis, Mo.," was submitted to Mr. Edward Flad, Water Commissioner of that city, and has recently appeared in print as a municipal document. Like many other reports on the subject, it abounds in technical terms which are not yet generally understood, and the introduction of certain theoretical computations relating to the annual loss of metal by a number of lines of subterranean water pipe in St. Louis, has caused this particular report to be sharply criticized editorially in the issue of the *Street Railway Journal* of July 11th. As both the report and the criticism are of interest to water works superintendents, a brief outline of the essential points is herewith given.

The author of the report states in his introductory paragraphs that, "the subject of Electrolysis, as applied to the electrolytic deterioration of sub-surface metallic structures, due to a part of the return current diverting from the tracks of the single trolley system, is to-day causing more diversity of opinion than any other electrical problem so vital to public interest and welfare; and that the confusion of evidence contained in contradictory reports is due, on the one hand, to lack of proper knowledge on the subject, and on the other hand to the partisan influence brought to bear upon the engineer for the electric street railway companies, compelling him many times to issue unwarranted statements inconsistent with the established laws of electric currents, by discarding facts for reasons beneficial to the Company."

As given by Mr. Brownell, the facts are as follows: The city of St. Louis has a very large street mileage and has required long lines

of street railway for the accommodation of its 650,000 inhabitants. The trolley system has six power houses and two sub-stations to supply the necessary current at 550 volts. Many of the routes extend miles from the source of power. Tracks are laid in about 175 miles of streets containing water mains, and if duplicate lines of water pipe are also counted, the aggregate length of such pipe laid parallel to the street railway tracks in said streets, is in the vicinity of 200 miles.

Throughout the city the tracks or rails are used as return conductors to the various power houses. The rails are of different type and weight, and are bonded by several methods, the most common being the ordinary copper bonding. The cast weld is used to a large extent, while the electrical weld has been applied only in very limited degree. In general, the track construction and rail bonding are not maintained at good efficiency.

The subsoil of the city consists principally of clay with some intermixture of sand. From chemical analysis of this soil taken at various points, it was found to be very favorable to the preservation of metallic pipes, having a slight alkaline reaction and with practically no corrosive effect upon either cast iron or lead. The alkalinity of the soil ranges from 0.018 to 0.032 per cent, with an average of 0.024. From 91 tests of the electrical resistance of the soil between the pipes and tracks in various parts of the city, such resistance was found to range from 0.108 to 0.027 ohm, with an average of 0.051 ohm.

In comparing the latter figures with those found in other cities, the author states that the subsoil of Lockport, N. Y., has the highest electrical resistance, the average there being 0.0846 ohm, while that of the Borough of the Bronx, New York, has the lowest, the average

* Engineering Editor of the MUNICIPAL JOURNAL AND ENGINEER.

there being 0.0392 ohm. The significance of the composition and resistance of the subsoil is that, in the author's opinion, the earth conducts the electric current which is diverted from the track rails as an electrolyte, and that he can find ample proof thereof in any city wherein the single trolley system is used.

From many tests made during the period from Jan. 22 to Mar. 7, 1903, the author finds that in the aforesaid 175 miles of streets in which the water pipes are laid parallel to the street railways, more or less electric current leaves the rails and flows into the earth and pipes for 121 miles, while in 54 miles the current flows from the pipes and earth into the rails to return by way of the tracks to the different power houses and sub-stations. This district in which the former condition prevails is usually called the negative area, while that in which the latter condition exists is termed the positive era. In the former, damage occurs to the rails, and in the latter, the pipes and other underground metallic structures are attacked and injured.

The author states that the earth usually shunts from 10 to 40 per cent. of the current used in the operation of a single trolley railway, and that this quantity of current so discharged into the earth

The pipes and track rails thus become large electrodes with the alkaline salts and moisture of the intervening soil as the electrolytes; and "electrolysis is the chemical dissociation that is brought about by the passing of a current of electricity from one electrode to another through a solution containing an electrolyte. All classes of earth hold these electrolytes in solution to a more or less degree. . . . When a current of electricity leaves the surface of a positive electrode, it must rob that surface of a certain amount of the metal, depending wholly upon the amount of current and its duration. . . . In the case under consideration, the electrodes are both of the same kind of metal, viz.: iron; hence the counter electromotive force of electrical polarization, which is brought about by the union of two dissimilar metals, is here completely eliminated. . . . The rate of electrolytic deterioration of a piping system is directly proportional to the product of the current flow in amperes and the time or duration of the current flowing from the surface of the pipes."

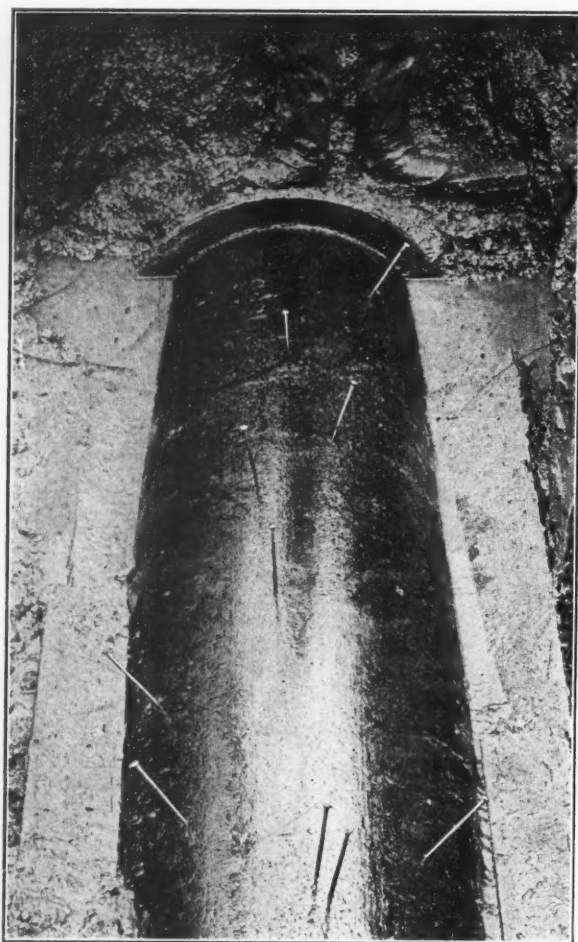
The author then states that the passage of a continuous current of one ampere per second from the surface of an iron pipe into the earth involves a loss of 20 pounds of iron from that pipe per year, and from a leaden pipe a loss of 70 pounds of lead per year. The same deterioration occurs in a cast-iron pipe as in one of wrought-iron, but as cast-iron pipe contains a large percentage of graphitic carbon, which is not attacked by the nascent chlorine or oxygen of the electrolyte, a pipe of that material often remains strong enough to resist the internal water pressure for some time after electrolysis has become established. If tar-coated cast-iron pipes are subjected to electrolysis, the surface usually becomes pitted, the pits being the result of greater current density at these particular spots, caused wholly by the adjacent soil coming in closer contact with the surface of the pipe; but in the case of uncoated pipes, the deterioration is more uniform.

The ordinary coating of coal tar on cast iron pipes is not an adequate protection against electrolysis, as it does not wholly prevent the passage of current to or from the surface of the pipes, and seems to succumb to the action of nascent chlorine liberated by the electrochemical dissociation. Insulated pipe joints have been proposed to mitigate the evil, but observation has convinced the author that such joints are worthless. He cites the case of a 6-inch cast-iron gas mains with cement joints, at Syracuse, N. Y., stating that they have a resistance of 12,000 ohms per 100 feet of length, and nevertheless, are not free from electrolysis in appreciable degree. Similarly, a partial insulation of the track by a concrete foundation under the same, has increased the electrical resistance between the pipe and the rails only 18 per cent. in Buffalo, N. Y. This low increase may be due to poorly mixed concrete.

The author states that by noting the difference of electrical pressure between the water pipes and track rails, as well as the resistance of the intervening earth at numerous points, he has been able to compute the flow of current along a number of routes. From these calculations, he finds that the "total amount of current found to be escaping from the tracks of all the electric street railways throughout the city is 6,407 amperes, while the total amount of current passing back to the rails to, from and over the water pipes or system is 6,149 amperes. This current will remove an enormous amount of metal from the cast iron mains and lead service pipes, but there is no practical way of demonstrating what percentage of this depreciation is confined to the cast iron or the lead pipes, since they form one general water distributing system."

He then gives a table of streets in which the water mains are shown by the tests to be affected, and on computing the amount of metal removed therefrom electrolytically, on the assumption that all of the current leaves the cast iron pipes, he concludes that such loss is 122,980 pounds of iron per year. He also remarks that if the deterioration were uniform over the surface of the affected pipes, it would not be so very serious, but that when the pitting is taken into consideration, it becomes a dangerous matter.

Unfortunately, the author has failed to give in his report many essential data which would enable others to verify his calculations or estimates, and consequently has exposed his work to severe attack by those whose experience with electrolysis in other cities has led them to consider his statements as highly exaggerated and sen-



SHOWING THE EFFECTS OF ELECTROLYSIS IN ST. LOUIS

"spreads out into vast dimensions, depending largely upon the distance between the place of entering the earth and the place of leaving the earth, necessarily governed by the topographical and subterranean conditions of the intervening soil formation. It is, however, a very common occurrence to find the earth currents diverging three to four miles from the place of entering the earth and that of returning back to the rails. . . . When a current of electricity is flowing through the earth independently, it encounters in its path practically all the piping lines, but in the outlying or negative districts, the current densities are so slight that they are insufficient to produce serious electrolytic corrosion. As these earth currents approach the localities where they must return back to the rails, their densities increase and become more menacing to the piping lines over which they must travel as they rise from subterranean paths."

sational. Some of his fundamental propositions, such as that "electrolytic corrosion must be governed wholly by Ohm's Law," are ridiculed, and doubt is cast over his entire work. In support of his assertions concerning the damage done to the underground pipes, however, he exhibits a series of very interesting photographs of certain lines of pipe after they had been exposed by excavation, and the damaged places thereon marked in a unique manner by *driving large wire nails into the substance which had once been good cast iron.*

These extraordinary photographs are presumably all genuine, and have not yet been questioned in any comments on the report which have come to the writer's notice. They exhibit very clearly a serious condition of the water pipes in the positive area, and fully justify grave apprehension as to their continued serviceability. No amount of adverse criticism of the author's theories and computations can discredit this peculiar evidence, and it behooves the critics to offer a satisfactory explanation of this singular deterioration of the cast iron pipes, if it is not due to electrolysis as charged. The matter should certainly not be treated in a frivolous manner or dropped, as the safety of the water distributing mains of a city may be of vital importance during a large conflagration.

As measurements of voltage and current are of interest in cases of electrolysis, the data given by the author in connection with the aforesaid photographs are herewith given in tabular form.

No.	Location.	Size of Pipe, Inches.	Number of Volts that pipe is positive to rail.	Resistance of intervening earth, ohms.	Amperes of Current flowing in Pipe.	Character of Subsoil.	Age of Pipe in Years.
1.	Cor. Geyer Ave. & 18th St.	6	3.5	0.040	4.0	Sandy clay	...
2.	Cor. Geyer & Missouri Aves.	6	0.1	0.008	43.0	Sandy	...
3.	Cor. Chouteau & Ewing	20	2.4	0.020	18.0	.....	...
4.	Cor. Chouteau & Compton	30	7.5	0.035	60.0	Wet blue clay	5.0
5a.	Cor. Park & Compton Aves.	30	4.4	0.050	25.0	Compact clay	5.0
5b.	Cor. Park & Compton Aves.	12	4.4	0.060	80.0		Older
6.	Cor. Shenandoah & Vandeventer Aves.	12	4.8	0.050	6.0	Heavy clay	4.5
7.	Cor. Vandeventer & Shaw Aves.	36	11.0	0.022	12.0	Wet clayey loam	6.0
8.	Cor. Grand & Shaw Aves.	36	4.8	0.025	15.0	Clay	7.0
9.	Cor. Grand Ave. & 20th St.	48	2.0	0.010	62.0		18.0
10.	20th St. near Farragut St.	36	1.5	0.025	25.0	"	...
11.	Cor. Penrose & Blair Sts.	20	2.4	0.030	21.0	"	17.0
12.	Cor. 14th & Salisbury Sts.	6	9.2	0.055	2.2	"	*1.0
13.	Cor. 11th & Salisbury Sts.	6	5.8	0.050	4.0	"	*1.0

In nearly all these cases, the pipe was badly corroded or pitted, and nails were driven into places where the iron had become soft.

* Pipe is older, but was not subjected to serious electrical action prior to January, 1902.

The tar coating was generally found destroyed or damaged, and in some instances a deterioration of the lead joints was observed.

The author objects strongly to the practice of making metallic connection between the pipe and return conductors in the immediate vicinity of the power house, and claims that while such connection may be of benefit to the pipes in a part of the positive area, this benefit is at the expense of the pipes in the outlying district, "and causes an electrical condition far more serious than that which it attempts to remove."

The remedy suggested for mitigating the evil is to "increase the return circuit to the highest available efficiency, making the electrical resistance so low, by perfect rail bonding and return feeders, that little current will be diverted into the earth and upon the pipes. To do this work successfully requires both expense and good electrical engineering, but there is no reason why the amount of diverted current cannot be reduced to a very small percentage." To prevent the evil entirely requires the use of insulated circuits, as in the underground conduits of New York or the overhead double trolley system of Cincinnati.

In view of the serious trouble which has been experienced in many cities where single trolley electric street railways are in operation, and the manifold difficulties attending the discovery or location of points where the underground pipes have been dangerously weakened by electrolytic action, it becomes both unwise and unscientific for water works authorities to acquiesce fully in the sharp criticisms which have been made of Mr. Brownell's report. Assertions that danger from electrolysis does not exist or is practically negligible are easily made, but the proof thereof is extremely difficult and is usually evaded in a mass of generalities and statements that will not bear close analysis. Too many evidences of palpable damage are on record to justify entire faith in the present ability of the operators of trolley railways to reduce the evil to a negligible quantity, and the time has arrived when it is proper for them to formulate a safe positive practice, instead of expending much energy negatively.

It is also proper to add that in making so many quotations from the aforesaid report, there has been no intention on the writer's part to endorse either the methods, computations or conclusions of Mr. Brownell. The only purpose was to set forth the essential facts in the case, and to indicate that it is expedient for authors of such reports to explain their measurements and computations in sufficient detail to make a defense and verification thereof possible by others. Brevity is often a great virtue, but it may likewise be a cloak for egregious error.

ANOTHER INCREASE IN MEMPHIS WATER SUPPLY

THE rapid growth of the city of Memphis, Tenn., has necessitated an increase in its water supply, and a commission composed of Messrs. W. H. Bates, James S. Davant and J. M. Baker, appointed to report on the works in South Memphis, has handed in its findings. But a year ago the city purchased the plant of the Artesian Water Company, and now it has found that the plant in South Memphis will be needed in the future, consequently it is taking time by the forelock and will buy the South Memphis works if the report of the commission proves satisfactory to the council and citizens.

In its report the commission recognized that a supply of from 20,000,000 to 30,000,000 gallons per day would be needed on account of the rapidity with which the city was growing. Any increased supply, however, must come from a territory at least four miles distant from that supplying the present works. The growth of the city towards the south and the manufacturing interests in that section pointed to the South Memphis works as a probable supply, which also satisfied the four-mile limit. A letter to the commission from Mr. Thomas T. Johnston, of Chicago, who originated the artesian system of the city, stated that the water mains of the city would be taken up with the water for this section which must be carried over four miles, while the drain on the old works would be severe because of the lowering of the water level due to increased

pumping. Consequently the old Artesian Water Company decided to locate the auxiliary plant at South Memphis to supply that section. This plant has become self-sustaining, and may be expected to yield a revenue if the city should buy it. Taking into consideration all the advantages possessed by the plant at South Memphis, the commission recommended that the city purchase the plant for its auxiliary system.

A minority report was submitted to the council by Mr. Baker, of the commission. He is not in favor of the proposition to buy the works, considering them "a crude affair," with the only value in a few thousand feet of water main. Considerable expense would be entailed on the city in placing the works in condition, and the operating expenses would be a loss to the city. He claims that the location of the plant is not of the best, one of the three wells already sunk having given no water. He believes that a thorough investigation should be made and that another section of the city would yield better supplies. Meanwhile extra wells should be sunk at the present plant to take care of the consumption until a good location for other works could be obtained. Other sections of the city that are asking for mains should be supplied first before outside sections of the city were taken care of. He recommends that the city do not purchase the plant.

MEDINA STONE PAVEMENT IN NEW YORK

Medina Stone Used in Rochester for Fifty Years with Perfect Success—To Be Extensively Used in Greater New York

By Walter J. Somers, C. E.

NEW YORK has more miles of paved streets than any other city in the United States—one thousand, seven hundred and sixty-five; it has seven hundred and sixty-one miles of unpaved streets, which is more than any other of the larger cities excepting Chicago, which has two thousand, eight hundred and sixteen miles. Of New York's improved streets, two hundred and eighteen miles are paved with cobblestones, four hundred and forty-nine with granite and Belgian block, two hundred and ninety-eight with asphalt and asphalt block, and seven hundred and sixty miles of macadam. Its cobblestone pavements will rival anything in the world in point of roughness; a poorer cobblestone pavement cannot be found outside of the borough of Brooklyn, and there are more miles of this kind of paving than in any other American city, excepting Baltimore, which has three hundred and twenty-one miles.

TOO MANY MILES OF GRANITE

Unfortunately, in addition to the large amount of undesirable cobblestone pavements, there are four hundred and forty-nine miles of granite and Belgian block pavements, the most of which is in wretched condition so far as evenness is concerned. As a matter of fact, the laying of granite and Belgian blocks ought to be dis-

dina stone pavement in the borough of Brooklyn; besides, a stretch of this pavement was laid early in the present year in the borough of Manhattan in connection with the approach to the Williamsburg Bridge. A view of the latter is shown in the accompanying illustration.

In the March, 1903, issue of the MUNICIPAL JOURNAL AND ENGINEER, Mr. E. A. Fisher, City Engineer of Rochester, N. Y., in his article on "Medina Block Stone Pavements," carefully enumerated the merits of this form of pavement as observed from its long use in Rochester. He also called attention to the good qualities of Medina stone as a material for curbing and cross walks. By a reference to that article, it will be seen that Mr. Fisher holds the highest opinion possible of this form of pavement, an opinion which is being shared by a larger number of city engineers each year.

MEDINA STONE A SUCCESS IN BROOKLYN

The pavements which are now being constructed in the borough of Brooklyn are laid at about the same cost as granite. The specifications call for blocks from three and one-half to five and one-half inches wide, seven to twelve inches long and six to six and one-half inches deep. The blocks are laid with fine joints filled with a



MEDINA STONE PAVEMENT IN GREATER NEW YORK—BELGIAN BLOCK IN THE FOREGROUND

continued in every city, and Medina block substituted, for the reason that the former invariably wear turtle back and smooth, thus making an exceedingly rough, uneven, slippery and insecure foothold for horses, not to mention the wear and tear on vehicles due to the excessive roughness. Medina block pavement wears even, but not smooth, and never wears turtle-back in shape, and it always gives a good foothold for horses, and its evenness reduces the injury to vehicles to a minimum.

Happily for the future of the great metropolis, Medina stone pavement was used for the first time in Greater New York last year, when two blocks were laid. It has been included among the standard paving materials for use in the borough of Brooklyn during the current year, and several contracts have been awarded for Me-

cediment grout, thus adding considerably to the smoothness and noiselessness of the pavement. As Medina stone is not as slippery as granite, there is not the same necessity for wide joints. There is less tendency for the horses to slip on Medina stone than on any other form of block stone pavement, and as compared with the slipperiness of asphalt, Medina stone is far superior. The writer took occasion to examine the Medina block pavement on Main street, Rochester, a year or so ago, and he has also examined the block stone and other forms of pavement in the leading cities of the United States. As there is rather a steep grade on Main street, Rochester, any other form of pavement—perhaps, except bitulithic—than a block stone could not be used on account of the slipperiness. But this Medina stone pavement has been down for about

twelve years and is undoubtedly the best stone pavement in the country. While there is a great deal of traffic on that street, it has never rutted nor worn uneven, and it is as level and perfect, almost, in its surface, as it was the day it was first laid.

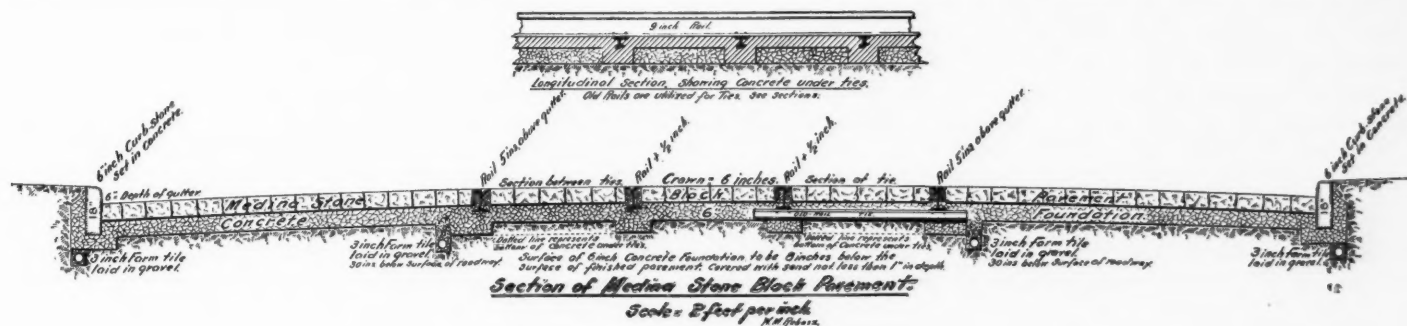
USED ON DELANCY STREET, MANHATTAN

The first Medina stone pavement to be laid in the borough of Manhattan was in connection with the approach to the Williamsburg Bridge, and as it was the original intention to pave this street with asphalt and as the concrete had already been prepared for the asphalt pavement, it was necessary to cut down the depth of the blocks. The specifications for the Medina stone pavement, there-

as the blocks are shallow, and notice how it does wear. The engineer in charge exercised the greatest care in laying and grouting this pavement, in order to make it the more durable. Taken as a whole, it is a credit not only to the contractor, but to the Engineering Department as well.

100,000 FEET USED AS CURBING IN NEW YORK

As a curbing material, Medina stone has no superior. It is furnished in several different colors and delivered in any shape desired. It was first used in Greater New York last year, and 100,000 lineal feet of this curbing has been shipped to the New York market, where heretofore bluestone had been exclusively used. All of the



CROSS SECTION OF MEDINA STONE PAVEMENT IN ROCHESTER

fore, call for a depth of only three and three-quarters to four inches to be laid in a cement mortar and poured with a grout of one part Portland cement to one part of sand. The width was to be from four to five inches, the tops of the blocks to have a smooth, even surface without any projection or depression exceeding one-quarter of an inch. The Highway Department of the borough of Manhattan abandoned its first purpose to lay asphalt on this street for the reason that there is rather a steep grade at one point and also because a fire-engine house faced on that street, and it was deemed wiser to have a non-slippery pavement. The width of Delancy Street is only thirty feet between the curbs, and as there is a double car track and an exceedingly heavy traffic, the pavement will naturally wear in grooves. The hardest kind of pavement would wear in grooves under such a test, as has been demonstrated at the Manhattan and Brooklyn entrances to the Brooklyn Bridge, where steel plates, which come in contact with the wheels of passing vehicles, have to be replaced every three or four years. It will be interesting, therefore, to watch this pavement, at this point, particularly,

Medina curbing for the New York market has been shipped in the rough and cut on the streets where it was to be used, under the direction of the contractor.

It has only been within the past few years that Medina stone has become generally known as a paving and curbing material, but in the old and well established markets for this particular stone, Syracuse, Rochester, Buffalo, and Cleveland, it has been used almost to the exclusion of every other form of stone, both as a paving and curbing material, and it would be a difficult matter to supplant it in those cities. It is only a question of time when the good opinion of these cities will be shared by the majority of other cities in the east, south and middle west. Until Medina stone began to be more extensively quarried and placed on the market as a paving material, Belgian or granite block was considered the only material suitable for those streets whose heavy grades would not permit the use of some less slippery form of pavement, but now that Medina stone has entered the field there is no reason for using the less desirable material.

WORK OF CONNECTICUT SEWERAGE COMMISSION

THE work of the Connecticut Sewerage Commission has been, in part, to supervise sewage disposal plants in the several cities and town of the state that have been installed. At the present there are nine such places, viz., Bristol, Danbury, Granbury, Litchfield, Meriden, Norfolk, Ridgefield, Simsbury and South Manchester. In Bristol, Danbury and Meriden, sand filters have proved most satisfactory in the ten years that they have been in operation. The purpose of the filter is to make the sewage odorless, colorless and non-putrescible, so that in rivers already unfit for potable water supply it will not further pollute them; the purpose of sand filtration is not to make potable water out of sewage.

The commission warns against the overloading of sand filters with sewage because only a certain amount of sewage can be properly disposed of in a certain time, and any more sewage placed on the beds will only clog them and prevent purification. For this reason the manager of a sewage disposal plant should not be removed for any political purpose, as a green hand will soon put the plant out of business.

Respecting the effluent from the Meriden beds, the report states that not only is the stream colorless, without odor, but fish live in it and the bed of the brook is free from organic deposit. The beds at New Britain, which have been just constructed, are capable of disposing of from 300,000 to 400,000 gallons of sewage per acre, every

day. At Ridgefield, the beds are not doing well because the material of them is poorly adapted for filtration and insufficient provision for under drains, together with lack of intelligent supervision.

In taking up the relation of water supplies of the state in connection with sewage disposal, the report states that the water companies are becoming more careful in guarding both their reservoirs and water sheds from chances of pollution. Several companies have been planting their water sheds with trees of special character, thus retarding the flow of water and reducing the chance of pollution.

In studying the sewage disposal for the towns of the state it is necessary to know just what are the water sheds, and the commission has prepared a map of the state showing the potable water supplies, areas having water supply and sewer system and location of the sewage disposal works, etc. The map was prepared by Mr. Frederick L. Ford, city engineer of Hartford.

The commission warns against the common impression that water from wells or springs is necessarily purer than surface waters, showing that wells, as ordinarily constructed, can be readily contaminated. It further states that a closely built town with a water supply but no sewer system is in a dangerous condition from the standpoint of the sanitarian. Bound with the report is the second paper on the "Action of the Septic Tank on Acid Iron Sewage," by Prof. L. P. Kinnicutt and H. P. Eddy.

BRICK PAVEMENTS*

Brief Description of Their Origin and Qualities—Hardness, Toughness and Strength—Homogeneity and Uniformity—Imperviousness to Moisture, and Density

By George W. Tillson, C. E.

BRICK pavements have been used in Holland since the thirteenth century. In the seventeenth century the roads from the Hague to the Scheveningen were paved with brick. These brick were $7\frac{3}{4}$ inches long, 2 inches wide, and 4 inches deep. Holland, having no natural material of its own suitable for pavements, was fortunate in being able to make bricks out of the silt and deposits of the river, which have been very successful in pavements. Some stone has been used in the larger cities, most of it having been brought from Sweden. Amsterdam and Rotterdam at the present time use brick quite extensively, the former city having now about 181,500 square yards. The life of the brick pavement there is said to be on an average of from ten to twenty years. In Amsterdam it is generally used on one side for ten years, when the bricks are turned, after which they will last about four years, making a total life of fourteen years. The foundation is usually a bed of sand from 8 to 12 inches deep.

It is said that Japan has had brick pavements for more than one hundred years, and one authority gives the dimensions of the brick as 7 inches long, 4 inches deep, and $1\frac{1}{2}$ inches thick. Inquiry made of the authorities in Yokohama elicited the following reply:

"I have to say that the brick pavements in use in Osaka since very ancient times are composed of broken roofing-tiles set on end, usually obtained from *débris* of houses after conflagration. Heavy traffic quickly destroys these pavements."

England has never used brick to any great extent in pavements; but in Staffordshire so-called blue brick, described in detail in a previous chapter, are said to have been in use for about fifty years.

In the United States the first brick pavement was laid in Charleston, W. Va., in 1870. This was a small portion of the principal street in the city, laid by a private citizen at his own expense, without any encouragement from the city and despite the ridicule of the spectators. The city paid no portion of the expense. The pavement was so good, however, that in 1873 the experiment was continued on a larger scale, the city paying the cost. This latter pavement, although laid twenty-seven years ago, is said to be still good and to have received very little repairs. This brick was a hard-burned building brick, and samples taken up after having been down twenty years showed a wear of $\frac{1}{4}$ to $\frac{1}{2}$ inch. Its specific gravity was 2.48.

In Bloomington, Ill., in 1875 half a block of brick pavement was laid. The brick were of local manufacture. So successful was this experiment that in 1877 the city made a contract for paving half a block of Centre Street. This street was relaid in 1894, and when taken up the brick were found to be worn about three-quarters of an inch. This pavement consisted of two courses of brick, the bottom course being laid flat and the top course on edge upon it.

Wheeling, W. Va., adopted brick for paving purposes in 1883. These brick were laid on tarred boards on a sand base, with a cushion of about 1 inch of sand between the boards and the brick. Brick in Wheeling have entirely superseded cobblestone, which was the only paving material previous to 1883. About 18 miles have now been laid.

Steubenville, Ohio, laid its first brick pavement in 1884. A letter from the official in charge of streets in 1899 says: "The pavement is still in good condition, has required no repairs, and from present indications will last ten years longer without repairs. These brick

were laid on a foundation of 2 inches of sand and 6 inches of gravel, the joints being filled with sand."

Galesburg, Ill., where, at the present time, so many first-class paving-brick are being manufactured, also first began their use in 1884.

Brick pavement were first used in Zanesville, O., in 1885. The City Engineer in 1899 says: "By reason of relaying the street-railway tracks, this pavement was torn up and relaid three years ago. New bricks were used, as many were broken, and the wedge-shaped bricks used in 1885 were no longer obtainable or desirable. A small part of this portion of the street is still in position and serviceable, showing good wearing qualities."

Peoria, Ill., first constructed brick pavement in 1885. This consisted of two courses of brick, laid on a gravel foundation, with a layer of sand between the two courses. The material was simply hard, specially selected local building-brick. In 1899 the City Engineer said "The street at present is in very bad condition, and should have been repaved before now. No money has been spent for repairs except for openings for service connections."

Of the larger cities of the country, Philadelphia was the first to adopt brick, laying its first pavements of that material in 1887. So popular, however, did it become there that its use continually increased, until at the present time it has a greater mileage of brick pavement than any other city in the country, and in fact in the world.

New York City, south of the Harlem River, has but one block of brick pavement. This was laid in 1891 on a cement-concrete base, the joints being filled with paving-cement. The work was done (as is usual under such circumstances) as an experiment. The brick with which it was laid were called pyrogranite and were made in New Jersey under a special patent. It was claimed by the patentee that by treating any clay with this process a good paving-brick could be made. These brick were $8\frac{1}{2}$ inches long, $5\frac{1}{2}$ inches deep, and $2\frac{3}{4}$ inches thick. Although having been in use nearly nine years, subjected to the heavy traffic of a street-car street, with an elevated structure also in the centre, the pavement is now in good condition and has received almost no repairs. This being a patented article, and having been so successful, it will be interesting to compare an analysis of this brick with that of the Metropolitan block of Canton, O., which is conceded to be one of the very best paving-bricks.

TABLE No. 65

	Silica.	Alumina.	Sesquioxide of Iron.	Lime.	Magnesia.	Absorption End-Section in 24 Hours.
Pyro-granite	73.03	22.46	2.94	0.25	trace	0.47
Metropolitan Blk.	63.74	22.86	8.81	0.65	1.82	1.82

The success of these early brick pavements is somewhat surprising. It is especially so when the quality of the brick used at that time is considered, as well as the method of laying. The brick-manufacturers then had very little idea of the possibilities of a vitrified brick. With too many people a brick simply meant a brick. Then, also, with the best intentions, no one was able to select the best material. The best of the brick used at that time would not be considered as a paving material, even, at present. It is not strange, either, that brick were not taken up more rapidly as a paving material. Engineers as a class are proverbially conservative. They never do anything without a precedent unless obliged to. It was hard for them to believe that any artificial product could equal even the productions of nature, but some people did have faith in burned clay, and by their persistent efforts have succeeded in establishing brick in the front ranks of paving materials. In fact, a great many actually believe that it is the best

* This is the first of a series of four articles on "Brick Pavements," by Mr. George W. Tillson, Chief Engineer of the Borough of Brooklyn. It is a reprint of the chapter on that subject from his valuable work on "Street Pavements and Paving Materials," published by John Wiley and Sons, New York. The complete work has 532 pages, octavo in size, bound in cloth, and sells for \$4.00. Copyright, 1900, by George W. Tillson.—[EDITOR.]

material for street pavements under almost all conditions, and the most radical advocates offer to guarantee a brick pavement to withstand the traffic equally well as granite. That it is bound to be the principal paving material in the Central West, where natural stone can only be obtained at a great expense, and where clays and shales are especially adapted for brick-making, is sure.

To make a good pavement bricks should be hard, tough, strong, homogeneous, impervious to water, and dense.

HARDNESS

A paving-brick must be hard in order to withstand the action of the traffic and impact of the horses' shoes. It is the one thing which is naturally looked for by the inspectors on the street, and it is sometimes extremely difficult to draw the line between a hard and a soft brick, between one that should and one that should not be used. The color can sometimes be taken as a guide, and in fact almost always if one is acquainted with the particular make of brick; but it will be impossible to pass judgment upon one make of brick by any standard that has been arrived at from an examination of brick made from entirely different clay. In fact, when a new brick is presented for use, a careful study must be made of its characteristics, so that one may be able to detect the difference by its general appearance. After having determined this, the color is a pretty sure indication of the hardness of the brick. Engineers, as a rule, have not made any attempt to measure the hardness of the brick, and very few specifications say anything definitely upon this subject. Brick, however, can be easily tested for hardness by the use of Mohs' scale.

The scale of hardness as introduced by Mohs consists of the following minerals:

1, Talc, common laminated light green variety; 2, gypsum, crystalline variety; 3, calcite, transparent variety; 4, fluorite, crystalline variety; 5, apatite, transparent variety; 6, orthoclase, white cleavable variety; 7, quartz, transparent; 8, topaz, transparent; 9, corundum, cleavable varieties; 10, diamond.

The hardness of a substance may be found by attempting to scratch it with any of the above minerals. For instance, if a brick will scratch apatite but not orthoclase, its hardness must be between 5 and 6. If it scratches quartz, and is also scratched by it in about the same degree, it is of about the same hardness and is consequently 7. To determine the percentage between the above will require considerable practice, as it depends upon the readiness with which one mineral scratches the other.

A rough test for hardness of a paving-brick can be made by attempting to scratch glass. If it slightly scratches it, the hardness can be taken as about 5, and if it scratches it readily, its hardness will be practically 6.

TOUGHNESS

A very hard brick is apt to be brittle, and unless it is tough it will crumble under traffic and be of little use in a pavement. This probably is the most important quality that the brick possesses, as almost any paving-brick is sufficiently hard to withstand the weight of the traffic, but may not be able to endure the blows of the wheels or of the horses' feet.

When an engineer is unable to make a thorough test of any brick submitted for examination, if the test for toughness can be applied and it is satisfactory, he would be comparatively safe in adopting it for use.

STRENGTH

A brick should be strong, because, on however good a foundation it may be laid, or however well bedded, it is liable to be loaded at times unequally, and if not possessed of sufficient strength is likely to fracture. As vitrified brick are made to-day, however, there is very little danger on these points, and it is very seldom that the brick that will pass the test for hardness or toughness will be rejected on account of its lack of strength.

HOMOGENEITY

Unless the particles of the brick are perfectly fused and have become one complete new mass, it cannot have obtained its full strength. If it be subjected to any sudden strain, it is liable to fracture between the particles of which it is made, when, if thor-

oughly burned and vitrified, the fracture should be regular without any regard to its previous make-up. It should be free from all marks of the machine with which it is mixed, as they both weaken the brick physically and allow spaces for moisture to collect.

UNIFORMITY

All products of the same kiln should be uniformly burned. While this is sometimes difficult to be obtained, if proper care is exercised in the burning, and the brick are selected at the kiln before shipment, satisfactory results can be secured in almost every instance. A better pavement will result from a lot of brick that are uniformly burned, even if not up fully to the required standard, than from a lot which is perhaps one-half perfect and the other half somewhat inferior, for when subjected to traffic the harder brick will maintain their size, while the softer brick will wear and the entire surface soon become rough and uneven and very disagreeable for travel.

IMPERVIOUSNESS TO MOISTURE

The porosity of a paving brick is one that can be easily tested and has received considerable attention by engineers. It has been generally considered that 2 per cent. is the maximum amount of absorption that a good paving-brick should be allowed. Very few good shale bricks will exceed this, but bricks manufactured from fire-clays, which from their nature are incapable of vitrification, will in almost every case absorb more than this amount. It has generally been considered that the danger of absorption in a paving-brick was similar to that in building-bricks, that is, its liability to disintegrate under the action of frost, but it must be remembered that paving-brick and building-brick are two different substances. In order to reach the point of vitrification brick have been subjected to so severe a heat that they have acquired a strength which is fully able to withstand all actions of the frost, and tests made have borne out this view of the question. Tests for porosity, however, are valuable, as they indicate, in a way not otherwise possible, the amount of vitrification that has taken place, especially on the exterior. If the brick be thoroughly vitrified, it cannot be porous and cannot absorb any appreciable amount of water. While this test should not be given up entirely, it does not at the present time receive as much attention from engineers as it formerly did.

DENSITY

Density is measured by specific gravity, and specific gravity is measured by the amount of material contained in any substance. If, then, one brick be of greater specific gravity than another, it must contain more wearing material and, other things being equal, will endure longer under traffic. The specific gravity can of course be easily obtained in a laboratory by the usual process.

While it is comparatively easy to specify the qualities that a paving-brick should have, it is not always so simple to decide in what way its different properties should be ascertained when any particular brick are presented for examination. When specifications are made for paving-brick, it is necessary to set some standard with which to compare all samples that are submitted, and also to have a positive and, if possible, simple, method of determining to what extent the samples agree with this standard. Otherwise there will be endless arguments with agents of the different materials, each one claiming every merit for his product and being very prolific in reasons why it should be adopted. The qualities which have generally been considered to be of most importance and for which standards of tests have been adopted are toughness, crushing and tensile strength, and imperviousness to moisture.

In searching for some method of ascertaining the amount of wear that a brick would sustain under traffic on the street, engineers have made many experiments. An experiment which was made several years ago in St. Louis, detailed in the chapter on Pavements, would be satisfactory and conclusive as far as abrasion of the wheels is concerned, but it does away entirely with the action of the horses' feet. After considerable investigation it was decided to test the brick for its qualities in an ordinary iron-foundry rattler which is used for polishing castings. Bricks were placed in this

rattler together with a quantity of iron scrap and revolved for a certain length of time and the percentage of loss to the brick calculated. This, however, was soon found to be a crude method, and that the results obtained in one foundry would vary very much from those obtained in another when the same kind of brick were used. This arose from the fact that the rattlers were of different sizes, and also because the charge of brick and iron scrap varied in each case. It was soon seen that something definite must be adopted for this test in order that the results would be of any par-

(TO BE CONTINUED)

ticular value, or that tests made in different sections of the country could be compared intelligently. The National Brick Manufacturers' Association were the first ones to take this up systematically, and in 1895 a commission was appointed, composed of engineers, manufacturers, and scientific men interested in the subject, to report to the Association a form of test for brick. The commission organized and selected different members for the investigation of the different branches of the subject, and reported to the Association in 1897.

WOOD PAVEMENT IN GREATER NEW YORK

Novel Method of Laying Wood Blocks in Bed of Portland Cement—Accepted Practice in England—Specifications for Work in New York—Different Method Used for Bridges

*By F. A. Kummer, C. E.**

INASMUCH as quite a number of contracts for wood pavement have been let by the city of New York during the past few months, some account of the methods employed in laying same may be of interest to your readers.

EXTENSIVELY USED IN GREATER NEW YORK

For general street work, wherever the pavement has been laid throughout the city, a block, 4 inches by 4 inches by 8 inches, of all heart yellow pine, treated so as to be both antiseptic and waterproof, has been employed. The specifications call for such waterproof qualities in the block that they shall not absorb over three per cent. of water after being heated so as to be thoroughly dried for twenty-four hours and then immersed in clear water for a like period. As a matter of fact, the blocks delivered for paving several streets in Brooklyn—among others Clinton Avenue, Gallatin Place, Monroe Street and Java Street—absorbed, under this test, 98/100 of one per cent., showing the extremely waterproof nature of the treatment to which the blocks are subjected.

Specifications for laying the block call, first, for a foundation of Portland cement concrete four and one-half inches thick, upon the top of which is spread a bed of Portland cement and sand mortar one-half-inch thick, the blocks being set directly in this mortar bed

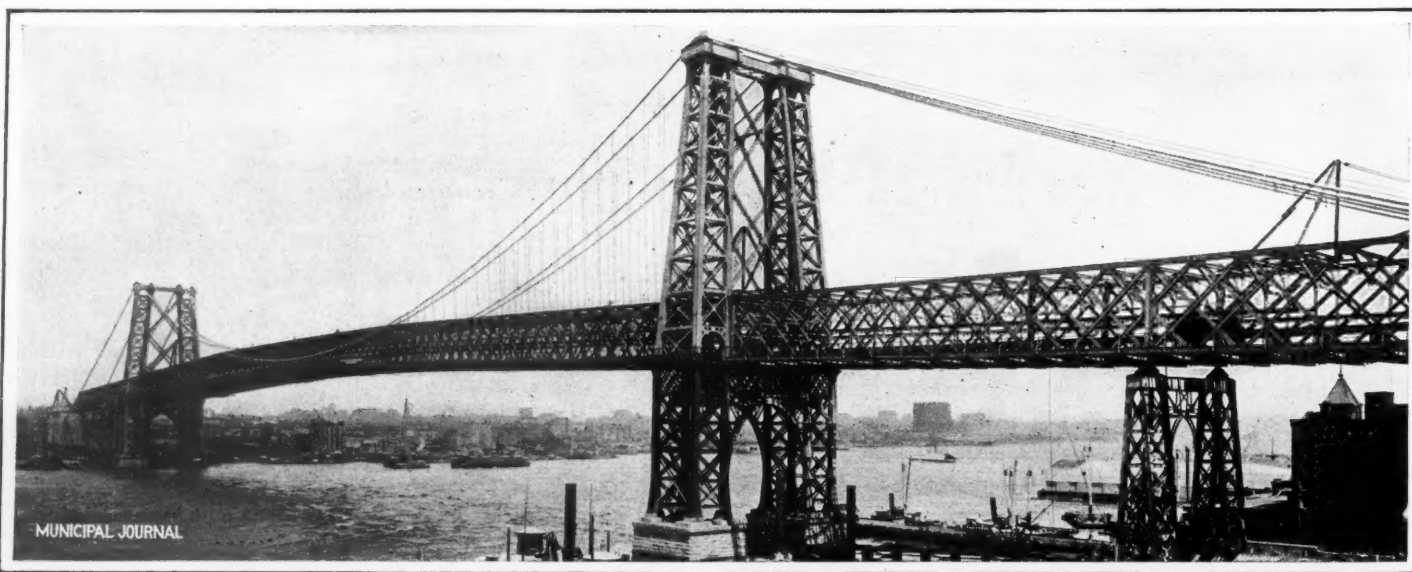
mortar bed of this character in connection with wood pavements, with the exception of a bridge over the Erie Canal at South James Street, Rome, New York, specifications for which were issued last fall and contain a clause calling for the same method of construction. This form of mortar bed is also being used at present in laying asphalt block, the three-inch blocks of asphalt and crushed stone being so laid instead of on a sand cushion, as was formerly the practice. The accompanying cut in the advertising pages shows the completed wood pavement on Clinton Avenue, Brooklyn, before the joints had been filled with sand.

SALIENT POINTS IN SPECIFICATIONS

The specifications for the laying of the blocks are as follows:—

"Upon the surface of the concrete foundation shall be spread a bed of cement mortar one-half inch in thickness; this mortar surface shall be composed of a slow-setting Portland cement and clean, sharp sand, free from pebbles over one-fourth inch in diameter, and mixed in the proportion of one part cement to four parts of sand. The mortar top shall be 'struck' to a true surface exactly parallel to the top of the finished pavement.

"The blocks shall not be less than two and one-half inches wide, seven inches long and three inches deep, or three inches wide, eight



WILLIAMSBURG BRIDGE—CONTRACT AWARDED FOR PAVING WITH CREO-RESINATE WOOD BLOCK

without the use of an intervening sand cushion. This is the practice almost universally employed in England, where wood pavements have been more widely used than in any other section, being, in fact, laid to the exclusion of almost all other forms of pavement. So far as the writer knows, this is the first use in this country of a

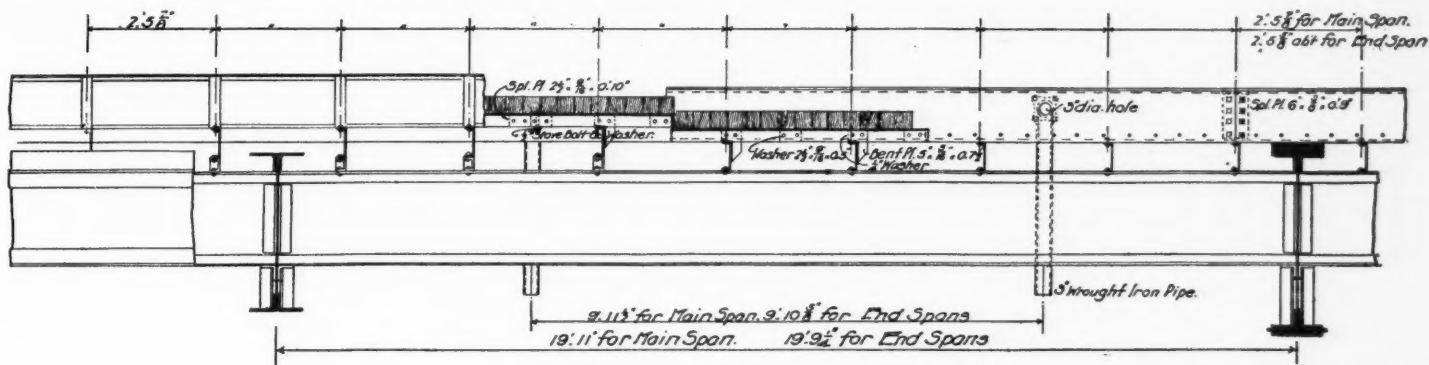
*Assoc. M. Am. Soc. C. E.

inches long and four inches deep, uniform in depth or thickness. They shall be laid with the grain vertical and at such angle with the curb as the engineer may direct. They shall be laid in parallel courses with as tight joints as possible, each block being firmly imbedded in the mortar so as to form a true and even surface. The joints shall then be filled and kept filled with clean fine sand."

There seems to be considerable contention as to whether better results are secured by the use of a sand cushion with wood pavements or by the use of the mortar bed just described. With any non-elastic paving surface, such as brick, the use of a mortar bed would make the completed pavement entirely too rigid. There would be no elasticity whatever in the structure and disintegration

DIFFERENT METHODS USED FOR BRIDGE PAVEMENTS

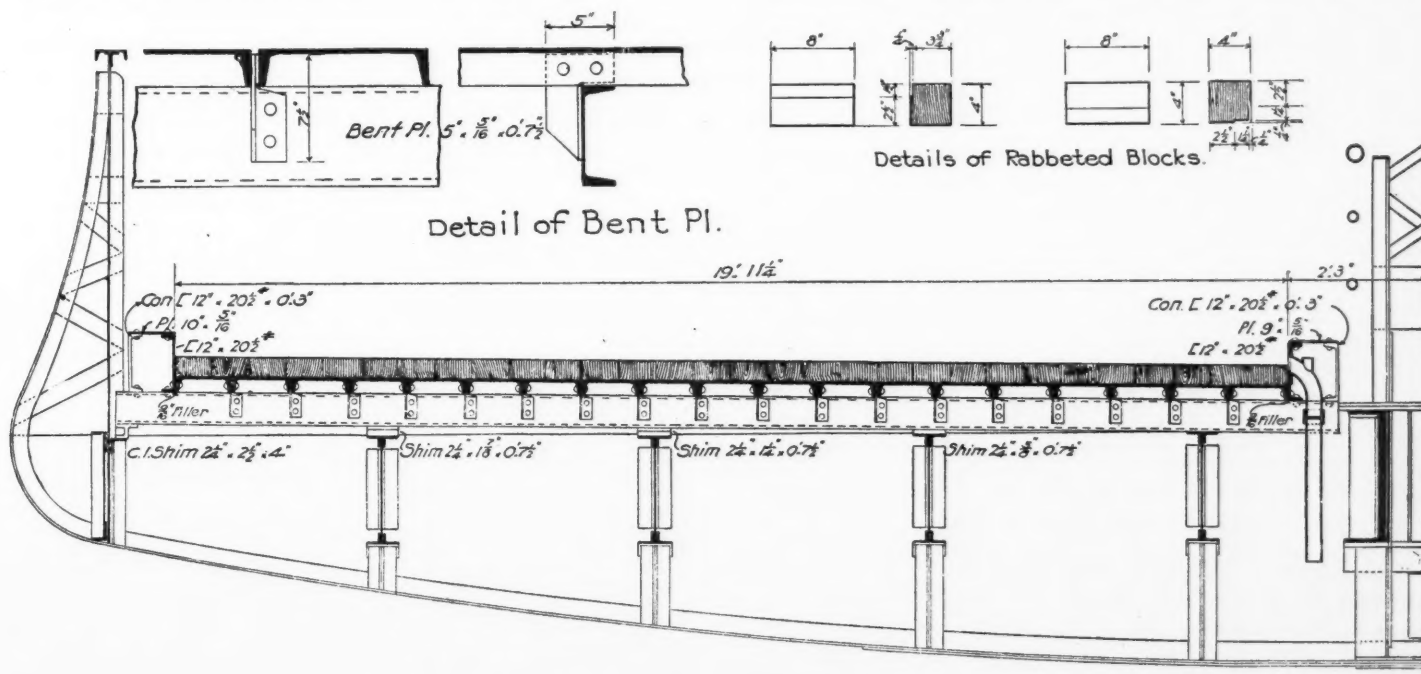
A somewhat different method of laying blocks was adopted in the case of two bridges paved, one for the Bridge Department and one for the Brooklyn Rapid Transit Company, in Brooklyn, recently. One was the Washington Avenue bridge over the Wallabout Canal, having a traffic of some four thousand teams per day; the other,



of the paving surface would therefore result much more quickly. The concrete foundation with a mortar bed upon it after the latter had set would act as an anvil, and the brick paving would be crushed as it were between this anvil and the blows of heavy traffic. With wood pavements, however, this is not the case, because the wood blocks themselves are extremely elastic and under such heavy blows readily transmit the shock of the blow to the concrete foundation without themselves suffering injury. It is this great elasticity of the wood block which renders them so extremely durable. The constant pounding upon granite block crumbles away the surface, but upon wood block the only result is a slight compression of the fibers, thereby rendering the surface of the pavement even more hard and indestructible than it was originally.

the Metropolitan Avenue bridge, over Newtown Creek. In both cases the blocks were laid directly upon a yellow pine flooring without any intervening sand cushion. The blocks used were three inches deep instead of four inches, as on the regular street work. In both cases the rail upon the bridge was only three inches deep, and therefore it was impossible to place any cushion whatever upon the pine planking. The reason for desiring a cushion in these cases arose from the fact that the pine decking of the bridge, although thoroughly creosoted, had been in use for some years and was slightly warped, and therefore the decks of the bridges did not present a smooth and even surface upon which to lay the pavement. But the shallow rail prevented any such cushion being used.

Upon the Metropolitan Avenue bridge the decking was fairly



SECTIONAL VIEW OF WOOD PAVEMENT ON WILLIAMSBURG BRIDGE

In laying the blocks on this mortar bed the sand and cement are mixed fairly wet and spread upon the surface of the concrete, which is also wet down so as to cause the bed to adhere to it. The mortar bed was then struck with a template to bring it to a true surface and the blocks quickly laid thereon. Only a very little tamping was necessary to bring the blocks to a perfectly true surface. As soon thereafter as possible the joints were filled with very fine, clean sand. The pavement is allowed to remain unused for four or five days after completion to insure perfect setting of the mortar bed, and is then thrown open to traffic.

even and no bad results were observed; but upon the Washington Avenue bridge the uneven bearing of some of the blocks has resulted in their splitting under the heavy traffic which passes over the bridge, the loads over some running up to seven or eight tons in some instances. The splitting of the blocks, however, has apparently done no damage to the pavement, which, after several months of wear, is in perfect condition in spite of the enormous traffic which passes over it. It is guaranteed for five years, although the plank-ing previously used on this bridge had to be renewed every year at a cost of about \$1.20 per square yard, making a total cost at the

end of five years over \$6.00. The three-inch paving surface was laid, including guarantee, at a little more than one-third of this.

Still another form of construction in wood pavements in Greater New York is to be found on the new Williamsburg, or East River Bridge, connecting New York and Brooklyn, contract for paving which with creo-resinate wood blocks was recently awarded to the United States Wood Preserving Company, of 29 Broadway, New York, which also laid the other pavements herein described. This contract, embracing some 12,000 square yards of pavement, is to be carried out this summer. Here the blocks are laid directly upon a surface formed by laying steel channels lengthwise of the bridge, as shown in the accompanying cut. The surface of these channels is to be thoroughly coated with asphaltic cement and the blocks laid directly therein. This form of construction has the merit of extreme lightness as well as great durability, and is fireproof, as no wood surface is exposed to possible sources of combustion from below, and the treated surface of the pavement has, by careful tests, been shown to be entirely fireproof, even though fires be built directly upon its surface. The construction was referred to a committee of experts, embracing, among others, the late Mr. George S. Morrison and Mr. C. C. Schneider, formerly vice-president of the American Bridge Company, and their report was favorable to its use.

SAND CUSHION USED ONLY ON ONE STREET

The only street in Greater New York paved with creo-resinate wood block on a sand cushion is State Street, between Henry and Hicks Streets, Brooklyn, this paving having been laid in the fall of 1902, with very satisfactory results. The paving, in fact, has given such excellent satisfaction that a contract has just been awarded to the United States Wood Preserving Company by the city of New York for continuing the paving of State Street, from Hicks Street to Furman Street. On this extension the mortar bed previously described will be adopted, as it is the opinion of the Department that this gives better results than any other form of construction.

The amount of wood pavement used in Greater New York the past year is not large when compared with the immense areas of asphalt paving laid, but this is to some extent due to the fact that asphalt prices in New York are extremely low, far below those of properly constructed wood pavements. At the same time, the writer ventures to say, that the experience of Greater New York with wood pavements will be so satisfactory that the yardage of the pavement laid will increase from year to year in spite of its high cost, it being evident that the greater durability, the noiselessness and the other advantageous features of this form of pavement much more than offset its higher price.

DRAGGING IMPROVES DIRT ROADS

No Longer an Experiment—How the Work Is Done—Dragged Roads Infinitely Better Than Common Dirt Roads

By D. Ward King

THE use of the split log drag is no longer an experiment in Missouri and adjoining States. I began dragging in 1896 and have dragged regularly ever since. I dragged a half mile stretch of road for four years before any of my neighbors began, but after they

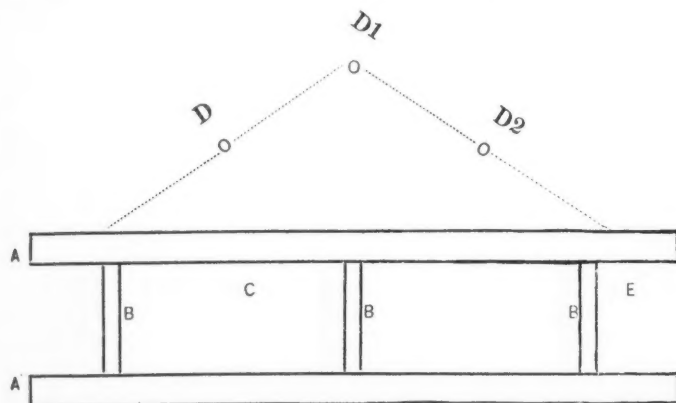


DIAGRAM OF MR. KING'S DRAG

started they came with a rush. Now the county has a standing offer to furnish the material to any farmer who will make and use a drag. To show the simplicity of this "drag," fifteen were made this spring at one crossroads blacksmith shop in one week. The Missouri State Board of Agriculture has made road dragging a feature of its Farmers' Institutes the past year and with fine results. A post-master reported one hundred and fifty miles of road dragged within a week after our meeting; another, in asking for a road meeting this year, says last year's meeting did more for the betterment of the roads than anything in the history of the community.

The drag is not intended to replace the road machine nor will road dragging do away with the necessity of macadamizing the main thoroughfares as soon as we can be educated to see the wisdom of spending a little money each year in crushing, spreading and rolling stone. The drag seems to be the connecting link between the old and the new; it keeps the old mud road in the finest possible condition and creates a desire for the best.

THE METHOD OF DRAGGING

The operation is extremely simple. I merely go over the stretch of road with a drag after every rain or wet spell. The land is rolling prairie, part of the soil is black and part of it is yellow clay. The dag is made by splitting a log, placing the two pieces on edge about thirty inches apart (with the flat sides both facing in the same direction) and pinning them together. The lower edge of the front piece is protected with iron; an old wagon tire will do. The log should be ten or twelve inches thick and about nine feet long. A chain or heavy wire is fastened a foot or eighteen inches from each end by which to haul it. A team is hitched so that the drag will move the dirt toward the center of the road. The hitch is next in importance to the time at which the dragging is done. The right time is just as



TRAVELING UNDER DIFFICULTIES

the road dries after a rain or when it is thawed on top during the winter and spring. It should be dragged *every* time it rains.

Of course a smooth surface for travel is thus produced, but a more valuable result is that the road will shed the next rain instead of

absorbing it. This is the reason why the road should be dragged after every rain, so that it always will be ready for the next. The way to make a good dirt road is to keep it so that the next rain will not go into it. This means dragging about once a month on an average. I drag from my own front gate to my neighbor's front gate, half a mile, taking about twenty minutes. I don't make very many trips to town before I have regained the time I expended in dragging, to say nothing of the gain to my neighbors and to the general public.

THE RESULTS ARE MARVELOUS

This method is very simple as I have said, but to one who is familiar with the ordinary dirt road under all conditions of season and weather, the results are little short of marvelous. Teams pass here at a sweeping trot when other roads are almost impassable. When other roads are in such a condition that loaded teams must be rested every few rods, the same loads are moved over this road at a free walk and without resting. Hon. Alex. Maitland, of Richmond, Mo., is quoted by the newspapers as saying: "I heard D. Ward King at Springfield, Mo., in January. I went home and made a drag. My road is a sticky yellow clay and I have only dragged it three times, but the rural route mail carrier says it is 100 per cent. better than the other roads. To use his words, 'When I come to your road I can drive right along at a trot, but I have a devil of a time getting over the others.'"

This half mile stretch of road is high in the center and very hard. Dragging *every time* not only makes it smooth for travel, but distributes the travel all over the road, packing it evenly instead of merely under the tires and under the hoops in parallel beaten paths; this increases the ability of the road surface to shed water. Dragging every time it rains spreads a thin layer of moist dirt over a moist surface and travel packs and pounds it together, every dragging adding just a little soil and the whole being thoroughly amalgamated and consolidated. After years of spreading and packing I have a road on which anything less than a week's wet weather makes little impression. In the spring when the ground thaws and unkept roads are so muddy and spongy that we say "the bottom has fallen out," this road remains in fair condition. It is also invariably dry one or two days before the other roads.

A horse's hoofprint will hold from a saucerful to a quart cupful of water. The neglected road presents a surface of upturned cups and saucers in which the water must stand until it either evaporates or soaks into the road bed. Dragging every time it rains, gets the road ready for the next and there are never any cups and saucers waiting. This method also does away with mud holes and chuck holes at the



THE ROAD THAT KILLS HORSES IN MISSOURI

bridges. After being dragged a few times the surface of the road stays up with the level of the bridges. One knows, only by the sound, that he has driven on or off a bridge. More dirt can be moved and more of a showing can be made by dragging the road during thaws in winter weather than at any other season. The soil is crumbly and mealy and pushes to the center very easily. If a road is dragged in March or April two or three times, it will show the

effect all summer. The weeds do not grow on the edge of the road as they do on a road that has not been touched after winter travel. But if one wants a road such as I have described he must live up to the motto "Keep the road ready for the next rain."

CORROBORATION

When talking with road men in the river bottoms they invariably bewail the lack of drainage, while the clay hill men envy the river



THE ROAD AFTER IMPROVEMENT—(2 B)

men because they have no washes. Both classes are quick to say: "If we lived on the black soil of the prairie we would have some faith in dragging, but here—," and words fail them. Now the truth of the matter is that either clay or gumbo will make a more substantial road than the soft prairie soil. The selfsame characteristics that make clay or gumbo so hard to get into good order after it once gets exceedingly bad will operate to keep it from getting into poor shape after it is once put into exceedingly good order. It will stay *good* just as tenaciously under good methods as it stays *bad* under bad methods. Certain gumbo roads, dragged of course, were used last summer, and summer before last as training tracks by trotting horsemen and as speedways by the gentlemen drivers of the vicinity. Dr. C. N. Scott, of Mound City, Mo., says in a letter dated November 22d, 1902: "I have traveled the gumbo road to Bigelow very often in the past five years and never saw it so good as it has been since they began to drag it. I go there to speed my horses. It is as smooth as a race track. I have many times driven over this two miles at a three minute clip." Mr. A. R. McNulty, of Mound City, has known this Bigelow road for thirty years, has been in the livery business for eleven years and has had the mail contract for eight years. He usually goes over this road four times a day. Mr. McNulty writes: "The road between Bigelow and Mound City has been in better condition this summer since the dragging began than ever before."

Hon. John Kennish writes: "The (Bigelow) road is a United States star route and is much traveled when fit for travel. It is over gumbo soil and at times is impassable. This fall the road has been worked by the King system of dragging and has been in better condition than ever before in the twenty years in which I have traveled it." Judge M. L. Nauman, of the Holt County Court, in writing of this road, says: "A portion of it has been so wet all summer that we could not make a start, but the other part never was so good before in the history of the road." It is but just to add that the season there was wetter than any on the records.

The accompanying photographs were taken a mile south of my house within 100 yards of the dragged road; the dragged road was in the condition shown in photograph "2 B," the same convexity, and firm and dry but not quite so smooth. When we drove into this place we had no idea that we would get a horse down. We thought we could stop in the mud and have a photo taken that would show the depth of the mud. But when we stopped the team the off horse seemed unable to find any bottom to the mud and sank, then began to flounder around and went down. He was down in less than thirty seconds after we stopped. Everybody hereabouts admits that this place would not have become impassable if it had been properly dragged.

SAND CEMENT- AND SAND LIME-BRICK

The Early History of the Industry—Better Than Old Style of Clay Brick—Adapted to All Kinds of Building Purposes

By Paul Tafel, C. E.

WHILE the application of burnt lime for building purposes can be traced back to the beginning of Oriental civilization, hydraulic mortar materials remained unknown, as far as can be ascertained, until the Romans began to embark on an aggressive colonial policy, which made it necessary for them to establish strongly fortified cities and ports wherever they had gained a foothold on some commercially or strategically important point. Thus we find the remnants of colossal harbor constructions of concrete blocks all along the extended coasts of the Mediterranean Sea. But the art of making a building material that will harden under water became lost with the general collapse of the old Roman Empire, and it remained forgotten for nearly fourteen centuries.

It was reserved for the English engineer, Smeaton, to throw some further light on the subject. Smeaton, when in charge of the reconstruction of the famous Eddystone Light-house, made the observation that mixtures of sand and crushed stone with certain specimens of lime, hardened much more rapidly and intensely when immersed in water than in the open air, and the circumstance that such lime when dissolved in nitric-acid, left a residue of clay, led him to the correct conclusion that it must be this substance which gave the lime its hydraulicity.

"Water lime" was subsequently manufactured then and there, on a large scale and given the name "Roman Cement," which was to say that this product furnished as good a mortar as that obtained by the old Romans from a mixture of lime and the volcanic "Pulvis Puteolanus." The English product, however, differed from that of the Romans, inasmuch as it was not an artificial mixture, but burnt directly from natural rock; i. e., from limestone containing more or less clay substance, similar to our "cement rock" or the German "Mergel."

At the same time the French scientist, Vicat, was carrying on extensive experiments for the purpose of obtaining a hydraulic cement by mixing pure lime and clay in certain proportions, which were subsequently burnt at a high heat and then pulverized, but, owing to the financial depression then prevailing in France in consequence of the revolution and the Napoleonic wars, the result of Vicat's investigations could not be subjected to a test in actual practice.

Meanwhile, in England, since 1810, several letters-patent had been granted on similar inventions, but their commercial value was rather doubtful, and it was not until 1824 that Aspdin of Leeds succeeded in manufacturing the first Portland Cement, so-called, because of this product blocks could be made that closely resembled the Portland stone, at that time a highly valued natural building material.

The new industry at once declared war on the old established arts

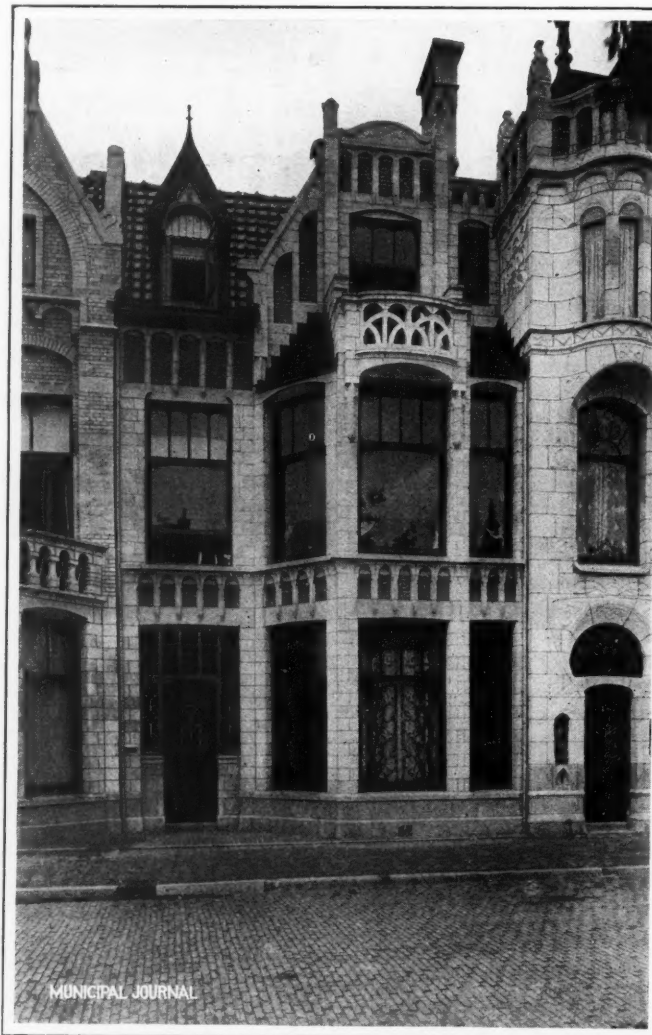
of brick-making and stone-cutting, and set out to conquer the civilized world. In 1834, French engineers constructed the famous harbor fortifications of Algiers in Tunis exclusively of concrete blocks; thousands of tons of Portland cement were shipped to India, Australia and Cape Colony for similar purposes; ship load after ship load went to Egypt for that gigantic enterprise, the Suez canal; American engineers set a lasting example of concrete block construction in the great retaining wall in Spring Valley, Cal., in connection with the water supply for the city of San Francisco, and the Germans built "all concrete" bridges across the powerful Danube.

Concrete is used for the canalization of our large cities; for the

construction of tunnels; for high roads and railroads;—in fact, there is no branch of all that is known under the name of civil engineering in which Portland cement does not play an important part or has not become a necessity.

The same revolutionizing effects had been prophesied about the Portland cement industry at the beginning of its career in regard to architecture, but, although Portland cement is used for the erection of imposing buildings as well as for smaller structures down to the villa or cottage, the prediction has failed to come true in its full extent. The causes are not difficult to determine. The civil engineer who is intrusted with the construction of a railroad tunnel, or of a bridge, or of a water reservoir, selects concrete as the most suitable material for purely practical reasons: on account of its hardness and durability; on account of the ease with which concrete can be adapted to various forms and shapes; on account of the fact that concrete work can be carried out by almost any kind of labor; on account of its impermeability for water; on account, finally, of its cheapness. All other considerations, especially the appearance of the structure or its architectonic beauty, are of secondary importance—if of importance at all. Not so in architecture. Here, a building must not

only suit a certain practical purpose, but it must also be pleasing to the eye in its appearance and durability, and cost must often make room to the former consideration. Besides, there has been a marked tendency during the last centuries to abandon the dark and sombre colors of medieval architecture as exhibited in the solemn cathedrals and palaces of old Europe and to employ lighter and warmer tints instead, as if to effect the soberness of our material age, and, while



ONE OF THE USES OF SAND LIME-BRICK*

* This illustration shows a residence in The Hague which is one of many constructed with sand lime brick, made by the same methods and machinery as those employed by The Schwarz-System Brick Company, 10 Bridge St., N. Y. City, by whose courtesy we reproduce the above.—[Editor.]

stamped concrete is used in large quantities for the foundations of the cellars, the main walls, for ceilings and even for roof construction, the outside finish as well as the decoration of the interior are still undisputedly left to the clay brick maker and the terra cotta manufacturer, to the stone-cutter and to the carpenter. The color of cement is "dark and cold and dreary" and even when used with a light colored sand or with crushings of light colored natural rocks, the effect remains unpleasant and dull.

Yet, despite these shortcomings of Portland cement—unimportant though they are—the manufacture of brick from Portland cement had become quite general, some fifteen years ago, especially in France and Germany; partly because enthusiastic inventors—like the originators of patent medicines—unduly exaggerated the usefulness of Portland cement and its adaptability to all the needs of the architect, partly because cement manufacturers saw in the production of cement brick a convenient means by which to escape the effects of temporary overproduction or of industrial depression. The defects of this product were soon recognized by the manufacturer as well as by the consumer and the making of cement brick on a large scale is, in Europe at least, gradually being abandoned.

We shall return to the subject in a more detailed manner later on.

The manufacturer of lime, during the second half of the last century, took a rather pessimistic view of the situation. It was thought that the rapid progress of the Portland cement industry would ultimately lead to the doom of the lime trade and many there were who looked about for suitable clay and, when the search was, or at least seemed, successful they burned a low grade Portland cement in the old fashioned lime kiln.

It was a false alarm. It is true that cement mortar is far superior to lime mortar—a fact which architects and builders readily recognized—and also that the cost of manufacturing Portland cement rap-

idly decreased with the ever increasing number of technical improvements in the manufacturing process, but, on the other side, the "century of inventions" constantly gave birth to new industries in the field of chemical technology, most of which require oxide of calcium as an auxiliary material, so that it is safe to say the manufacture of lime was never more profitable than it is to-day. We only have to think of the large quantities of lime that are consumed in the sugar refineries, in the manufacture of caustic alkalis, ammonia, calcium chloride, magnesia, soda, glass, stearic acid; in gas houses and power plants for purifying the gas and the boiler feed water; in tanneries; in numerous branches of metallurgy; in bleaching and in dyeing. Lime is used as a conservative for grain and other food products and thousands of barrels are bought by our farmers, who by its means give new life and new productive power to the soil. In fact, there is no other chemical product that has become as useful and as indispensable in modern industry. New quarries are being eagerly searched for, existing plants are being remodeled with the purpose of cheapening and improving antiquated methods of manufacture and of increasing the output.

It would unduly lengthen this paper to enumerate the different classes of raw materials from which lime can be made or to give a detailed description of the process of manufacture itself and of the mechanical appliances required for the same. We shall, therefore, describe in the next issue of the MUNICIPAL JOURNAL AND ENGINEER a novel and interesting and most profitable industry which came into life nearly fifty years ago and thenceforth, slowly but surely, secured for itself an important place among the industries which depend for their existence on the manufacturer of lime as well as amongst those that furnish us the materials for our public buildings, for our factories and stores, for our homes, and known as "the sand-lime brick industry."

(TO BE CONCLUDED IN OCTOBER.)

VENTILATION OF CONVEYANCES IN LONDON

THE ventilation of public conveyances is a subject which has been discussed a long time with little progress made toward definite conclusions. Much complaint has arisen on account of the illy ventilated 'buses in London, and the following description will indicate how most of these vehicles are ventilated. Many of the 'buses have no provision whatsoever for side ventilation. In some, three holes, two or three inches long and about one-half square inch in area, are made in the sides of the vehicles, but these are so small that they have little effect upon the atmosphere of crowded vehicles. Other of the 'buses are fitted with metal panels on the sides about three inches deep and having a number of perforations. During the cold weather the air will pass through the perforations, but if the atmosphere be moist and warm, ventilation is greatly impeded and considerable pressure is necessary to force the air through the apertures, which are only three-sixteenths of an inch in diameter. Another impediment to ventilation through these metal plates is the fact that the signboards are fixed on the outside of the 'bus immediately opposite the panels. Some of the vehicles are fitted with similar panels but have hinged covers which can be closed, if necessary. If these panels are let open, a fair amount of ventilation is obtained, but often objection is made by passengers to drafts and so it is necessary to close them all.

Another method of side ventilation in general use, consists of a long slot slanting upward in the wood work of the 'bus near the top, about one inch wide and running nearly the whole length of each side. The slot is divided by a thin louvre placed longitudinally and so forms two air ways. Except in very moist or warm weather this method gives fair satisfaction, for having no way of closing these apertures there is always some ventilation. Certain 'buses have an opening along the top which allows the air to be discharged underneath the seats on the outside when the 'bus is standing and sometimes when the 'bus is moving. The objection to this, however, is that the outlets often act as inlets when the bad air is drawn out at the back of the 'bus. Some 'buses have ventilators in the front ends and others have hinged flaps which cover openings in the front, which are usually closed in cold weather. For summer ventilation these do

fairly well but are too large for winter use and for minimum ventilation and are therefore closed.

To sum up, about half of the 'buses are fairly ventilated when the thermometer outside registers about 50° Fahr. and under, but at higher temperatures the conditions are very bad.

It is often asked how the ventilation of a 'bus can be had when the door is always open. It has been answered as follows: The atmosphere is very elastic and the heat of the body and the breath of the passengers expands the air coming in the door way, forcing the warm air and expanded air out through the ventilators, if there are any while the 'bus is standing. When the 'bus is moving these conditions cease to act because the moment the 'bus starts the atmosphere passing through pulls upon the air in the door way and interior of the 'bus and expands it so that instead of there being extra pressure upon the atmosphere in the 'bus to expel the foul air through the ventilators there is frequently a pull upon these openings and the power for ventilation due to heat and moisture, is less.

Regarding the ventilators in the sides of the 'bus, the atmosphere left behind as the 'bus proceeds pulls upon the orifices of the ventilators and the tendency is to draw the foul air outwards. If the ventilators are well made this would seem to afford perfect ventilation, but the suction upon the air in the 'bus through the door way is so great that if the area of the side openings be not well regulated, the tendency will be for the outside air to aspirate from within outwards and ventilation is seriously hindered. If the openings are small they will be of little use except in cold weather and if large they give rise to strong drafts. Ventilators which act as outlets during cold weather will become inoperative when the atmosphere is damp and close, the pull outward being balanced by the pull upon the air in the doorway. To remedy these bad conditions the head room in the 'bus should be about seven feet to the apex of the roof and the air should pass through the centre. The whole length of the roof should be open and should be fitted with flaps to be closed when the outside conditions warrant it. Ventilators should be placed in the front of the vehicle and should be fitted with flaps to be closed in cold weather.



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Outgrown Water Works

It is the experience of every growing community that a time comes when the existing waterworks are no longer capable of furnishing the required daily supply at the original pressure; and when this time has arrived, the community usually becomes divided in opinion as to the most expedient mode of procedure to remedy the annoyances and dangers that attend an inadequate supply of water.

In nearly every instance the trouble was foreseen by those in charge of the waterworks, and the inhabitants have repeatedly been urged to reduce the amount of water that is said to be needlessly or wantonly wasted by them each day. To support the charge of such waste, many figures of moderate consumption are compiled and submitted to the community, and it is shown therefrom that wherever the water is supplied through meters, the daily domestic consumption per head of population is much less than where it is furnished at a fixed schedule rate per year, regardless of the actual quantity drawn from the pipes. The use of water meters in the premises of all consumers is therefore urged by the Water Department as the prime remedy, in the belief that thereby the existing supply and works can be made serviceable for some years more.

The argument in favor of meters is certainly rational, and appeals forcibly to the commercial instinct of mankind, especially when it is shown authoritatively that the cost of obtaining an additional supply of water will necessarily be relatively great, and that the financial condition of the community renders such an outlay temporarily inexpedient. It accordingly secures many influential adherents who recognize its merits and advocate its adoption.

On the other hand, a large number of citizens are fully satisfied that no appreciable waste of water occurs in their premises, and are strongly opposed to the meter system, mainly on the ground of its expense. They claim that the large outlay involved can be applied far more advantageously to procuring an additional supply, and that a stinted use of water by the inhabitants will result in a serious impairment of the public health.

The community thus becomes divided on the water question into two opposing factions, and sharp debates follow, which often result in bringing to light many interesting details relating to waterworks construction and management. Among these details the following are of particular importance, viz.: Actual "slip" or loss of action of pumps, reduction of discharging capacity of main supply pipes

by the formation of tubercles of rust and organic growths, leakage of the system of main and distributing pipes, consumption of water for manufacturing, commercial and general public purposes, and wilful waste in households.

With a reference to the "slip" of pumping engines, much variation is found by close experimental measurement of the discharge, depending on the type and condition of the machinery and its rate of speed. In all such apparatus, there must obviously be more or less leakage at pistons, plungers, stuffing-boxes and valves; and it is reasonable to consider that at the same pressure, such leakage will be greater when the motion is slow than when the parts move fast. The percentage of this leakage may therefore be found much higher for a small than for a large delivery of the same engine under equal pressure, but it is rare to find a recognition of this circumstance in pumping station reports.

In a recent test of an old set of pumps, a "slip" of nearly 50 per cent. was found at a low rate of discharge, while at the normal speed of the machinery it was only about 10 per cent. As the pumps were worked slowly for at least ten hours each day, and the average slip was assumed to be not more than 10 per cent., it is evident that the daily pumpage was here greatly overrated, and hence also that the per capita consumption based on the previous pumping records was erroneous. It is therefore important to test the actual delivery of a pumping plant at proper intervals in order to ascertain the consumption correctly.

From the experience gained in many different places, it may be regarded as a fact that there is a progressive loss of delivering capacity, or an increasing frictional resistance, in all iron pipes for the conveyance of water. This loss is due to the formation of rust and organic growths on the interior surface. The former may occur in the entire length of the pipe, while the latter is generally confined to a section extending for some distance from the source, depending on the quality of the water. If the water is filtered or taken directly from deep wells, the chances for the development of an appreciable amount of organic growth in the pipe are reduced considerably, but filtration is not always a preventive; and if the water is taken directly from lakes, ponds, or streams, such growths are almost certain to appear at an early date, and may soon attain dimensions sufficient to affect the discharge very perceptibly.

The maintenance of the same initial pressure in a pumping plant, or the same fall or head in a gravity conduit, is therefore not proof that the discharge of the pipe remains the same after a number of years as it was in the outset. The actual delivery can be determined only from exact measurements, and the assumption that no deterioration of the inner surface of the pipe has occurred may easily lead to overestimating the consumption from 15 to 25 per cent.

No matter how carefully a pipe system may have been laid originally, some leakage is sure to develop at more or less of the numerous joints in the course of time. In the case of cast iron pipes, there are about 500 lead joints in each mile of the distributing system, besides the flanged joints and stuffing-boxes of stop-gates, the foot-valves of fire-hydrants, and the various cocks and joints in the numerous house connections, not considering the piping and fixtures in the buildings themselves. All this metal work tends to expand and contract by changes of temperature of the water, and the wear resulting from the small movements of the component parts ultimately causes a slight escape of water at many points. The summation of these numerous small leaks in an extensive distributing system, however, produces a considerable aggregate.

It must also be remembered that the water from these small leaks is usually absorbed by the surrounding soil and does not show itself on the surface. Furthermore, the quantity of leakage generally increases as time goes on, until it attains sufficient magnitude to appear on the surface. In permeable and well-drained ground, a large amount may thus escape before the source of the loss is definitely located, and meanwhile it is erroneously classed as waste by the consumers.

Obviously this leakage of the distributing system outside of private premises cannot be stopped by the application of water meters, and as its discovery is usually very difficult, the consumers who are opposed to meters feel quite safe in ascribing all excessive use of water

to defects in the street piping, and demanding that the Water Department shall repair the same before imposing upon them any further burdens of expense. In consequence of these conditions, water-works officials have been on the alert to devise and apply new methods of detecting waste both in the streets and private premises.

The quantity of water used for manufacturing, commercial and general public purposes should in all cases be regarded as distinct items of consumption, in order that a more intelligent estimate may be formed of the amount used in private households. In manufacturing towns large volumes of water are sometimes required for certain industries, and a very considerable percentage of the daily supply is used in public buildings, schools, fire department houses, parks, etc., as well as for sprinkling streets, flushing sewers and the construction of public works. The aggregate of these various uses of water is often as much as one-half of the entire consumption, and hence it becomes unfair to compare the water supplies of different towns on the basis of the per capita use.

By thus keeping a reasonably close account of the several principal items or classes of consumption, the question of applying meters to households will be easily answered. The quantity of water required for purely domestic purposes in our American cities has been definitely established by many reliable trials at from 35 to 45 gallons per head per day, and if the account shows a much larger consumption, it is legitimate to infer that wilful waste prevails among the householders. Such waste can then be most effectually prevented by placing meters on all premises wherein leakage or persistent negligence in the proper care of the water fixtures is found to exist. On the other hand, if the domestic consumption is not far in excess of the proper limit, and no curtailment of the other classes of use is practicable, evidence is at once afforded that the water-works are outgrown, and that an additional supply is needed.

The early recognition of the foregoing points by the Water Department will make either the introduction of meters or an enlargement of the works much easier than is usually the case. In general both remedies will ultimately be adopted, as it soon becomes clear to investigators that the works cannot be properly managed unless a sufficient supply of water is available, and proof is constantly at hand that undue leakage and waste does not prevail. Means for correctly and conveniently measuring both the supply and the consumption are therefore necessary, and by their intelligent use there will be far less friction and argument the next time that the works become outgrown.

EMIL KUICHLING.

"Cheap Paving the Most Expensive"

A GREAT deal has been said about the cheap asphalt pavements that were contracted for last spring in New York City. The cheapness of the pavement has been unduly emphasized. It needs no prophet to predict that the city of New York will find the pavements which were laid at \$1.10 a square yard the most expensive pavements it ever contracted for. The public and a certain class of city officials have been deluded too long with the impression that they could get as good results from a cheap pavement as from one for which a fair price was paid. They belong to that class of individuals who make a rush for bargain counters in the hope of getting a ten dollar silk umbrella for one dollar.

A good concrete foundation and a serviceable asphalt wearing surface cannot be constructed at \$1.10 a square yard. We have maintained all the time that \$2.00 was the only reasonable minimum price to be paid for asphalt pavement, and we can easily understand how local conditions might make it necessary to even double that sum before a good, serviceable pavement could be laid; but under ordinary conditions, \$2.00 would be sufficient.

In this connection we are glad to quote from our contemporary, the *Detroit Free Press*.

"The city of Detroit has been laying too much pavement, and laying too cheap pavement. All property owners want the streets in front of their property paved, but usually they insist on the cheapest possible paving materials. The reason for this is that while the

cost of the original paving is assessed on the abutting property, the cost of subsequent repairs and repaving is assessed on the city at large. The average property owner has no desire to build for the future. The city in general will care for that. His ambition is to secure a pavement at the lowest possible cost which will serve as a basis for securing better pavement. He is unwilling to be taxed directly for a first-class concrete foundation, and so all the city's original paving is on the shoddy order. Like all other shoddy work, it soon goes to pieces, and a new pavement must be laid.

"If the best quality of concrete foundations were laid originally, the cost of repaving would be greatly diminished. A good concrete foundation should survive the generation that laid it. With a good foundation, the surfacing will the better resist the traffic, and when it was finally worn out, a resurfacing will provide practically a new pavement. But that is not the way the city orders its affairs. All pavement is laid on the hand-to-mouth principle, and when it goes to pieces, the public assumes that it has been robbed, when the fact is that it has merely cheated itself by false economy. All the cities of Europe have ascertained that there is nothing more expensive than cheap pavement, and some day Detroit may discover the fact for itself. There is no hope that it will learn from the experience of others."

Rotten Asphalt in New York

THE deplorable condition of the asphalted streets in New York City have been attracting considerable attention for several months past, and the troubles of the Trust have been augmented thereby. Mayor Low has taken a hand in the matter and proposes to give it his serious consideration. He feels that unless the companies laying the pavements can be made to make good their guarantees in keeping the rotten pavements in repair that it will be a serious handicap to this administration and will be likely to militate against the success of the fusion movement in the fall campaign.

Health Commissioner Lederle and Street Cleaning Commissioner Woodbury have both complained bitterly to Mayor Low of the present situation in New York City. They have spoken in no uncertain terms of the poor condition of the Trust's pavements. Dr. Lederle declares that the great holes in the asphalted streets are beyond the reach of brooms and water of the Street Cleaning Department and so become active breeders of disease. Commissioner Woodbury has prepared and submitted to the Mayor maps of the city, showing the location of every bad piece of asphalt paving in New York.

It has been asserted that if the pavements were properly surfaced and the asphalt streets kept in proper repair, the city could be cleaned twenty-five per cent. easier than at present.

But the officials are not the only ones who have been objecting to the conditions of the streets' rotten asphalt pavements. The truck drivers are shunning the asphalt streets that are in the worst condition, as they say that the numerous holes make it dangerous to cart delicate machinery or fragile goods through such thoroughfares and that streets paved with Belgian blocks—usually considered the roughest kind of a pavement—are chosen in preference.

One of the results of this crusade against the Trust's rotten asphalt pavements has been that the contractors have been obliged by law to push their work of repair more rapidly and some relief is promised in the immediate future. Another result is likely to be the installation of a municipal asphalt repairing plant, ample enough in its proportions to provide for speedy and constant repair of all imperfect asphalted streets in Greater New York. Commissioner of Public Works Livingston favors the establishment of an asphalt repair plant, for the reason that, in a short time, the maintenance contracts with several of the paving companies will expire, so that under present conditions it will be impossible to keep the streets in good condition, because all the repair forces and plants now in use would not be able to renew street surfaces as fast as they are needed, when it is remembered that the total area of asphalted pavement exceeds two hundred and fifty miles. If other cities are wise they will profit by New York's unpleasant experience.

Municipal Ownership Abroad

THE opponents of public ownership, particularly in the United States, would like to have everybody believe that England is the only foreign country in which it is popular for a city to own and operate its own quasi-public corporations. And they would like to have us believe that it has become unpopular, even in England. The uninformed do hold such opinions, but readers of the MUNICIPAL JOURNAL AND ENGINEER and those who have other means of gaining correct information know differently. Municipal socialism, as it is often referred to, was never more popular nor more profitable for the municipalities of England than it is to-day. Not only the practice, but the sentiment favoring such ownership and operation in the cities of other countries—including France, Germany, Austria, Norway, Sweden, and others—is fully equal to that obtaining in Great Britain. Furthermore, the sentiment is growing, as is indicated by a consular report recently sent in to our State Department from a German city. It reads as follows:

"In Germany there is a very strong tendency on the part of the State or municipal authorities, as the case may be, to secure control of all the works which contribute in any way toward the public welfare. It is usually the custom on the part of local authorities to grant a concession for a certain number of years, providing that when the time expires the city shall assume control of the enterprise. In the majority of cases it has either been private enterprise or a stock company which has taken the initiative in German cities in introducing the most advanced technical and scientific improvements. This has been the case in small towns as well as in large cities. The water and gas works of Eibenstock, for example, were built a few years ago by a stock company organized by the citizens of the town. The ownership of both, however, was recently acquired by the municipal government and the company liquidated. Government control of all such enterprises has led to a great rivalry among the large cities of the Empire in striving to be first in the application of the newest methods and latest inventions known to science. The exhibits of the different cities of the empire at Dresden afford a striking opportunity to study the progress made in industrial science and its application in Germany to-day.

"The exhibition is divided into two parts. In the first section are the exhibits of the large German cities with regard to the progress made in recent years relating to municipal management of water-works, sewerage canals, underground wires, telephones, electric railways, gas and electric-light works, etc."

Sanitary Regulations of Barber Shops

THE last Legislature of New York State passed a sanitary code for the regulation of barber shops. The law has only recently taken effect. The Board of Health of New York has adopted the following rules in order to properly enforce the provisions of the state code. They are so reasonable and wise that we call attention to them with the hope that municipalities of other states where no such law prevails will demand the passage of similar legislation. The rules of the New York Board of Health are as follows:

(1.) Barbers must wash hands thoroughly with soap and hot water before attending any person.

(2.) No alum or other astringent shall be used in stick form. If used at all to stop the flow of blood it must be applied in powder form.

(3.) The use of powder puffs is prohibited.

(4.) No towel shall be used for more than one person without being washed.

(5.) The use of sponges is prohibited.

(6.) Mugs and shaving brushes shall be thoroughly washed after use on each person.

(7.) Combs, razors, clippers and scissors shall be thoroughly cleansed by dipping in boiling water or other germicide after every separate use thereof.

(8.) No barber, unless he is a licensed physician, shall prescribe for any skin disease.

(9.) Floors must be swept or mopped every day and all furniture and woodwork kept free from dust.

(10.) Hot and cold water must be provided.

(11.) A copy of the regulations is to be hung in a conspicuous place in each shop.

It will be noticed that the most of these rules are now observed by every well regulated barber shop, but it is also known that the cheaper barber shops rarely pay attention to all the necessary sanitary precautions in serving their patrons. The evils arising from unsanitary barber shops have long been known and we are glad to note the growing tendency to correct them.

The Convention Season

THIS is the season of the year for the meeting of various associations, and the months of September and October will be largely taken up with the meetings of important associations whose work is confined to the municipal field. The International Association of Electricians will hold its eighth annual convention at Atlantic City, New Jersey, September 2nd, 3rd, and 4th. An interesting programme has been arranged and a large attendance is expected.

The Union of Canadian Municipalities will convene for its third annual meeting at Ottawa, Canada, on the 16th, 17th, and 18th of September. Such subjects as "Town Improvements and Embellishments," "Municipal Home Rule," "Provincial Rights in Municipal Legislation," "The Present Position of Telephone Legislation," "Municipal Ownership," "Public Lighting Systems," and "Good Roads" will be discussed. A hearty invitation is extended to the city officials from the United States to attend this convention.

On the 7th, 8th, and 9th of October the League of American Municipalities will hold its seventh annual convention at Baltimore. A full account of this meeting, together with the greater part of the programme and an article about the convention city, will be found elsewhere in this number.

The American Society for Municipal Improvements will hold its annual meeting at Indianapolis, Indiana, on the 20th, 21st, and 22nd of October. The programme for this meeting has not yet been arranged, but it will be safe to say that it will measure up to or surpass any previous programme arranged in other years. We shall give a fuller account of this association and its work in our next issue.

The Better Way of Our English Cousins

THE avarice of American speculators is leading many municipalities into blunders which one hundred years hence will be looked on with wonder and amazement because of their sordidness. Here, if a large public improvement is to be made, such as the purchase of one or more blocks for the establishment of a park; the location of a terminus of a bridge, or any other extensive public improvement which is sure to enhance the value of the land contiguous thereto, the avaricious real estate speculator or political boss of the town immediately secures options on all the desirable property in the immediate vicinity of the proposed improvement so that if the proposed plan is carried out, the speculator makes his sale at an inflated value. In this way many millions have been made. But it should be noted that these deals could not be carried through except by the permission of the municipality. Here is where the municipality makes its serious blunder.

Our English cousins have a better way of doing things. If there is any increase in the valuation of land surrounding a proposed improvement, it is so arranged that the increased value goes to the civic treasury. The municipal authorities act long before the matter is made public and long before the real estate sharks can get their claws upon the prize. When any other than a municipal improvement is to be made which would have a similar effect, there are always a sufficient number of public-spirited gentlemen to come to the front and secure to the city the benefits accruing. As an instance of the latter, we call attention to the work of a group of London gentlemen who have banded together to secure eighty acres of desirable land adjacent to one of the stations at the tube railway which is to be established near Hampstead Heath. This committee, which asks for contributions to a fund to be expended for the purchase of the eighty acres mentioned, calls attention to the fact that if these singularly beautiful fields adjacent to the proposed station can be kept as an open space, the many thousands of people who will settle in

that vicinity will have a large park area to be enjoyed for all time to come; that the eighty acres of the Heath which it proposes to purchase is peculiarly lovely on account of their verdant wildness, the undulation of the surface and the outlook afforded over the country to the distant hills; that the necessary trampling of many passengers from the station will turn this beauty into barrenness unless the crowds can be spread over the larger space which it is proposed to secure; that there is a growing need for playing fields for football and cricket within a short distance of the metropolis; that parts of the proposed space might be made fit for games of all sorts, and so open to Londoners as well as those in the immediate vicinity, new opportunities for health, recreation and manly sports.

Two hundred and forty thousand dollars are asked for by the committee as the sum necessary to purchase this desirable piece of property, which is to be converted into a public park. The movement is receiving the support of many of the public men and women of London and nearly one-half of the required sum has already been subscribed. There is little doubt that the entire amount will be obtained.

We commend this sort of public policy to the public-spirited men of America and trust that the day will soon come when real estate sharks will not be thriving at the expense of the municipality.

An Important Suggestion for the League

ELSEWHERE in this issue, under the caption of, "A Suggestion for the League," we are glad to give publicity to some ideas of Mayor J. M. Head, of Nashville—who is a vice-president of that organization—as to how the membership and usefulness of the League may be largely increased. Although great good has already been accomplished by this organization, compared with its possible development, it is a mere infant. The interest in municipal affairs is universal, and we believe the time has arrived when either the League or some other national municipal organization should enlarge its field and increase its usefulness by planning its work on broader lines. There is no national organization better fitted to do this work than the League of American Municipalities, and we urge upon its members the serious consideration of, and action upon, the propositions submitted by Mayor Head.

League of Georgia Municipalities

It would be well for the municipalities of the country if every State had as active an organization among the municipalities as that of Georgia. At its last annual meeting last month, at Macon, it had for discussion a series of papers dealing with the vital questions which concern Georgia municipalities, every department of the municipality receiving some consideration. We believe that if every State were so organized and faithfully conducted, it would achieve great results toward purifying municipal government. Then, if each State became an auxiliary member of the League of American Municipalities, and if delegations were sent from State organizations, greater good would be secured than can now be hoped for from the unfederated municipal organizations that exist. Every State has its own local problems to solve, and is better able to deal with such questions than any other State. At the same time, there are broader questions which have a national influence and importance, and which could be better discussed and settled in a national organization with similar purposes. We hope that some of the numerous national organizations will take the initiative in this matter and secure a closer federation with State organizations of a similar character, and at the same time seek to bring about the formation of such organizations where they do not exist.

Proposed Public Buildings for Cleveland

THE spirit of civic improvement is abroad in the land. It manifests itself in some form in nearly every municipality in the country, from the hamlet to the city. Washington set the pace, which the larger cities will do well to follow, in the appointment of a commission to spend some months abroad in study and investigation in order to arrive at wise conclusions in the development of the National Capital. New York, Philadelphia, and Chicago have made futile attempts in the same direction, and now comes Cleveland with a report from a commission appointed to consider its needs in

the way of public buildings and the possible utilization of the group plan for the beautification of the entire city.

Our contemporary, the *Cleveland Plain Dealer*, gives an excellent half-tone of the plan submitted by the commission and includes an editorial criticism of the plan by saying:

"The scheme is attractive as worked out by the commission. It requires to be carefully studied in all its respects, financial as well as artistic, before final adoption. There are other considerations to be taken into account also, not the least important of which is the effect its execution would have in changing the character of the district and greatly enhancing the value of property in that part of the city, as well as purifying its moral tone."

The plan submitted shows that the commission has failed in one particular, and that is in relieving, even to the slightest extent, the "gridiron" effect of the city plan. It seems to be an utter impossibility to get away from the rectangular lines in the laying out of streets and avenues. The city, however, has shown the right spirit in consigning the consideration of the whole plan to a commission of carefully selected men, especially equipped for such a work.

City Water Plant Should Pay for Its Own Mains

ONE of the daily newspapers of Seattle, Wash., remarks, "Probably the most unpopular feature of the administration of city affairs in the city of Seattle, is the system of compelling property owners to pay all costs of laying water mains and in addition a higher rate for water than even a soulless corporation would dare exact." We quite agree with our contemporary and wonder how it ever happened that the municipal plant of that thriving western city ever made the blunder of compelling the property owners not only to pay a large price for water but the expense of constructing and maintaining the distributing system. It is a practice almost unheard of. We wonder still more that the citizens have submitted to such an imposition.

Plans for Filtration Plant at Youngstown Defeated

By the recent action of the City Council of Youngstown, O., the ordinance which provided for the appropriation of a sum of money to be expended in installing a filtration plant, was defeated. This delay, in our estimation, is uncalled for, for it was only too evident, not later than five years ago, that a purification plant was needed in Youngstown. No less than four expert investigations of the situation have been made, each submitting substantial evidence why a filtration plant should be installed. To continually delay the project is little short of criminal. We believe that Secretary Probst of the State Board of Health, should be called in the case and enforce an immediate solution of the question. The Councilmen who secured the defeat of this ordinance excuse themselves by saying that they wished to employ an expert to make another examination. This is merely an excuse for longer delay and is not, in any sense, to be looked upon as a good reason why there should be one. Our contemporary, the *Telegram*, of Youngstown, is to be commended for its efforts to hasten the installation of a filtration plant.

The Philanthropist's Opportunity

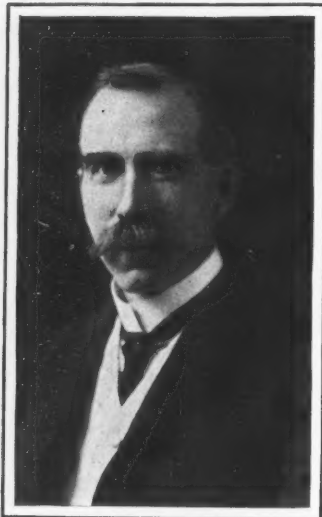
A CERTAIN noted philanthropist has been spending some of his many millions for the establishment of libraries throughout the world. We do not know of a request for assistance in this direction that he has turned down. We would like to suggest to him and to every person of a benevolent turn of mind who wishes to contribute something of lasting value to his town or city that, instead of investing money in libraries they put it into public parks, or playgrounds, or industrial schools under the control of a municipal government.

A library is not the greatest need or benefaction to any community, in these days of cheap books. A library would be patronized by a limited number of citizens and by the very class most able to purchase its own books. So far as that is concerned, the common laboring man can supply all his needs in that direction from even his meagre salary because the best literature can be had for a few pennies.

This is one reason why the philanthropist should not spend his money for public libraries. It would be much wiser to invest his

money in that form of public benefaction which is beyond the means of not only the laboring man but the middle class as well, which would take in the larger part of the population of every community. People cannot buy parks for themselves. The purchase, development and endowment of a public park playground, either in the heart or suburbs of any municipality, would be a more valuable benefaction—one hundred times over—to any community, than a public library.

Detroit's New Commissioner of Public Works



COMMISSIONER W. H. MAYBURY,
Public Works, Detroit, Mich.

THE change that has been made in the Department of Public Works at Detroit, Mich., has had the happy result of greatly improving the service. When the Council of that city removed Mr. D. W. H. Moreland from the position of Commissioner of Public Works, Mayor Maybury appointed in his place Mr. William Henry Maybury, a cousin of the Mayor. Mr. Maybury was a gentleman of independent fortune, a native of Detroit, and forty-three years of age. He has already done wonders in the improving of the condition of the streets and alleys. He has also seen to it that the brick furnished for paving the various streets under improvement were of uniform and good quality.

His watchfulness has prevented several contractors from laying inferior brick and he is gradually convincing the manufacturers that Detroit is not to be made a dumping place for poor material and that only first-class brick as well as other paving material will be acceptable. The contractors on one paving job especially have been compelled to cull three times the brick sent for use. The Commissioner would not allow any poor brick to be mixed with the good.

It is this looking out for the city's interests and seeing that the city gets the value of every dollar expended that marks the good official. Detroit is to be congratulated on its obtaining such a man for the important position of Commissioner of Public Works.

Personalities

—For the sixth time Mr. Arch. B. Calvert has been elected mayor of Spartanburg, S. C.

—Deputy Street Commissioner McGill, of Lynn, Mass., has been complimented by the press on his work of keeping the streets clean.

—Mr. John R. Garrison, of the Treasury Department, has been appointed by the Commissioners of Washington, D. C., Auditor of the District of Columbia, to succeed Mr. James T. Petty.

—Health Officer Aug. Schamacher has been dismissed by the Health Board of Hamilton, O., and Dr. Mark Millikin appointed in his place. The Health Board was greatly dissatisfied on account of the way Dr. Schumacher performed the duties of his office.

—In a message to the Council of Boise, Idaho, Mayor Hawley recommended a reduction in the tax rate, increase of the police force, increase in the salary of the chief of the fire department, the general parking of streets, removal of unsightly fences, and the paving of several important thoroughfares.

—Mayor Hunt, of Walla Walla, Wash., in his message to the Council, recommended liberal expenditures for public improvements, such as better street paving and extension of the water system. He urges that strict economy should be practiced, however, and that the Council should see that the city gets full value for every dollar expended.

—Mayor Howe, of Passaic, N. J., urges the city to take steps to acquire a municipal water plant. The contract with the private company does not expire for several years, but he is of the opinion that

the officials should seek a good supply and the best way of obtaining it so that the city would be all ready to build works when the contract with the private company expires.

—Mayor L. F. Boyd, of Spokane, Wash., has vetoed an ordinance of the Council providing for the removal of the doors and curtains in saloons during the closing hours. Mayor Boyd objects to the ordinance because it includes restaurants as well as saloons, and claims that it would not be right to destroy the privacy of people in restaurants by opening them up to the gaze of the passer-by.

—The small riot which arose at the joint meeting of candidates for Congress held in Houston, Texas, nearly caused the death of Mayor Holt, who was one of the candidates. Mayor Holt made several speeches in an attempt to preserve order, and then called upon the police. He started to punish several of the ringleaders with his fists, when the attempt to assassinate him was made, but the police interfered in time.

—Mayor Grainger, of Louisville, Ky., said recently that public baths for the poor were the most needed improvements that could be added to that city, and urged public spirited men of money to build free public baths. He says that if he had the money this would be the first thing he would do for the city of Louisville. The use of the one small public bath house demonstrated to him the popularity of these institutions.

—In a violent speech to the Board of Aldermen, Mayor Flanders, of Haverhill, Mass., sharply criticised the police, aldermen, and newspaper reporters, charging the police with laxity in the performance of their duties, the reporters with an attempt to misrepresent him and his party, and the aldermen with having allowed their influences to be swayed by the newspapers. He denied that it was his intention to appoint only socialists to office.

—It was stated recently that Mayor Becker, of Davenport, Ia., was to turn the government of the city over to Father Giglinger, who had fostered the general clamoring for sweeping reforms regarding the control of the resorts of the city. The priest is a sworn foe of gamblers and dive keepers, and the city would witness doings of an extremely strenuous nature if the mayor should take such action. The right of the mayor to take such a step seems rather doubtful.

—The Federal Grand Jury, at Washington, D. C., has indicted Mayor John T. Cupper, of Lock Haven, Pa., for conspiracy. Cupper's name is mentioned with that of former General Superintendent of Free Delivery Machen, of the Post Office Department, and he is accused of paying Machen a commission of ten cents per box for the privilege of receiving contracts to paint the letter boxes, etc., in Reading, Albany, Scranton, and many other cities of the country.

—In his annual message to the Council, Mayor Edward E. Bruen, of East Orange, N. J., stated that he hoped within a year at least East Orange would have its water supply. He strongly denounced the statements that appeared from time to time in the newspapers from the citizens of the city which were derogatory to the good name of the municipality. These statements were mainly with regard to the water supply and the general management of local affairs.

—In vetoing an ordinance requiring the closing of saloons, Mayor Bosch, of Hamilton, O., stated that he was in sympathy with the spirit of the ordinance, but not with the way sought to accomplish the desired object. The ordinance prohibits the sale of liquors on and after midnight, but the Mayor was of the opinion that it could not be enforced. He said what was desired was an ordinance that would close saloons at a proper hour and would also compel the blinds, curtains or screens to be opened so that any one could have a full view of the interior of the place. If such an ordinance were framed and passed, he would not hesitate to sign it.

—In a letter to a local paper, Mayor Phinizy, of Augusta, Ga., repudiates some statements made in that paper regarding the alleged bankruptcy of the city, and strongly advocates city ownership of the public utilities, especially that of electric light and gas plants and street railway, as soon as the city is in a financial condition to do so. He believes that many improvements should be made, but that none should be undertaken until the necessary funds are in hand. Those who are clamoring for these improvements, if

in the majority, should levy a tax to raise the funds necessary. While the city has nominally about 40,000 inhabitants, he says that but half of that number pay taxes, although the expenses of the city are as large as if there were really 40,000 taxpayers. Therefore the city should reduce the expenses of all the departments until the taxes are sufficient to warrant enlarged expenditures.

—The campaign against smoke nuisance has been started by Mayor Rose, of Milwaukee. The Mayor has been investigating the various smoke consumers and has reached the conclusion that there are some which will do all that is claimed for them, and so he has determined that manufacturers shall install one or another of these devices to prevent the pollution of the city's air. The Mayor submitted an ordinance to the Council, providing for the appointment of a smoke inspector at a salary of \$3,000 a year, and for a board, consisting of the city engineer, the commissioner of health, the chief of police, building inspector, and smoke inspector, for the suppression of smoke. The sum of \$500 is to be set aside each year for the expenses of the board. Any one who causes or allows dense smoke to issue from his stack or chimney shall be fined not less than five dollars nor more than fifty dollars, or be imprisoned for not more than sixty days for each day that such smoke may be allowed to issue.

Convention Dates

SEPTEMBER

The eighth annual convention of the International Association of Municipal Electricians will be held at Atlantic City, N. J., September 2nd to 4th. Frank P. Foster, secretary, Corning, N. Y.

The Municipal Engineers of Texas will meet at Fort Worth, on September 7th, to form a permanent organization. John B. Hawley, city engineer, Fort Worth, Tex.

The International Association of Fire Engineers will hold its next annual convention at Atlantic City, N. J., September 8th to 10th. Henry A. Hills, secretary, Wyoming, O.

The New Jersey State Firemen's Association meets at Atlantic City, N. J., September 9th. William Exall, secretary, 823 Broad street, Newark.

The National Firemen's Association will meet at Chicago, Ill., on September 28th and 29th. D. W. Gillen, secretary, 176 Monroe street, Chicago.

The National Fire Patrol Superintendents' Association will hold its annual convention at Atlantic City, N. J., in September. John J. Cashman, Brooklyn, N. Y.

OCTOBER

The next meeting of the League of American Municipalities will be held at Baltimore, Md., October 7th to 9th. John McVickar, secretary, Des Moines, Iowa.

The State Firemen's Association of Pennsylvania holds its annual convention at Allentown, Pa., October 6th to 10th. W. W. Wunder, secretary, Reading.

The next annual meeting of the American Society of Municipal Improvements will be held at Indianapolis, Ind., the 20th to 22d of October. George W. Tillson, secretary, Municipal Building, Brooklyn, N. Y.

AUGUST, 1904

The next session of the League of Georgia Municipalities will be held in Savannah the second Wednesday in August, 1904. Hon. Bailey, secretary-treasurer, Griffin, Ga.

Municipal Engineers of Texas to Form

THE municipal engineers of the various cities in Texas have decided to form an association for mutual helpfulness. A preliminary program was made up and a committee appointed to call for a meeting at Fort Worth. The circular issued by this committee, which is composed of City Engineers F. L. Dormant, of Houston; Hugh Raines, of Dallas; C. G. Wells, of Galveston; G. B. Gurley, of Waco, and John B. Hawley, of Fort Worth, selected September 7th as the best time for the meeting and have asked all the engineers that propose to attend to so notify Mr. Hawley. Papers will be read and the organization will be formed on a permanent basis. It is hoped that a large attendance will be secured so that the association will receive a good send-off.

Water Supply of Milan

AN attempt was made in 1888 to provide a good water supply for Milan and two trial wells were sunk, the first to a depth of 480 feet, or seventy-nine below sea level, and the other to a depth of 268 feet. At first the water was used for cleaning the sewer pipes and drinking. Four more wells were then sunk to a depth of ninety-eight feet and with a diameter of thirty-one and one-half inches each. They yielded an average supply of forty-one gallons per second and a reservoir of sufficient size to hold 42,382 cubic feet was constructed. The minimum level of the reservoir is ninety-eight and one-half feet above the pumps.

In 1896 it was necessary to increase the supply, and the pumps that had been supplying the public fountains in the gardens were incorporated in the general pumping system. They became unserviceable in 1901, and a centrifugal pump of the Sulzer type driven by an electric motor was installed. A new well, 197 feet deep, was sunk, giving seventeen gallons of water per second. It is provided with a sand filter. Meanwhile a new plant had been constructed to meet the demands of public and private service. It consisted of two pairs of double-acting pumps driven by electric motors. In 1900 four other Sulzer pumps driven by electric motors were placed on the outskirts of the city, being supplied by eight wells. At present the drinking water is used for many public services, such as street washing, grass plots, trees and drinking fountains, markets and laundries. The fire brigade also uses it from about 1,000 hydrants and it has supplanted ordinary well water in many buildings. In 1899 the consumption of water in the city was 146,226 cubic meters, while in 1901 it had risen to 5,545,226 cubic meters, and the increase is steadily going on. The per capita consumption is very high in Milan, being often fifty-four gallons, and shows much waste. From an American standpoint this rate, however, is small. Only about 200,000 of the 500,000 inhabitants of the city have access to the water.

How the Meter System Helped Mason City

THE experience that Mason City, Ia., has had in regard to the use of the meter system is interesting, and the champions of the system have pointed with pride to the results which include the saving of a large amount of water, with consequent relief to the pumps and the postponement of the day when increased supply must be secured.

A comparison of the present with the past conditions in respect to the water supply conditions is interesting. In January, 1900, the number of gallons pumped amounted to 6,353,030 and averaged this during the year. In 1901 the average was over 1,000,000 gallons more. In July, 1902, the meter system was generally adopted, and by December of that year the average monthly pumpage was but a little over 5,000,000 gallons. Comparing the figures showing the number of tons of coal used in pumping, it appears that in the last six months of 1900 564 tons of coal were used. During the same period in 1901 643 tons were consumed, while the amount for the same period in 1902 was but 316, despite the fact that new consumers were constantly being added. Based on a rate of \$2 per ton, a saving of \$1,104 per annum was effected by the meters, an amount equal to the 5 per cent. interest on \$22,000.

No one cares to pay for things that other people are to use, and this applies in the case of water consumption as well as in other directions. In the previous system of flat rates, two-thirds of the people were paying for what the other third wasted. The waste did no one any good, while it was very expensive from several standpoints. It was found, as in all other cases, that the meter system allowed an ample supply of water for all, while it cut in two the water bills of many persons. Each one paid for what he used, and those who criminally wasted the water were taught to be more careful or suffer the consequences in increased water bills. In the case of Mason City, the need of increased pumping facilities was urgent, but the laws of the State prevented the negotiation of a sufficient loan to cover the expense. The meter system, in reducing the pumpage, relieved the pumps and the drain on the wells, those but recently finished flowing by gravity to the reservoir and obviating all pumping.

MAINTENANCE OF ASPHALT PAVING

Use of Municipal Asphalt Repair Wagon in Chattanooga—How Long to Make Asphalt Repairs Before Resurfacing—The Building of Chert Roadways

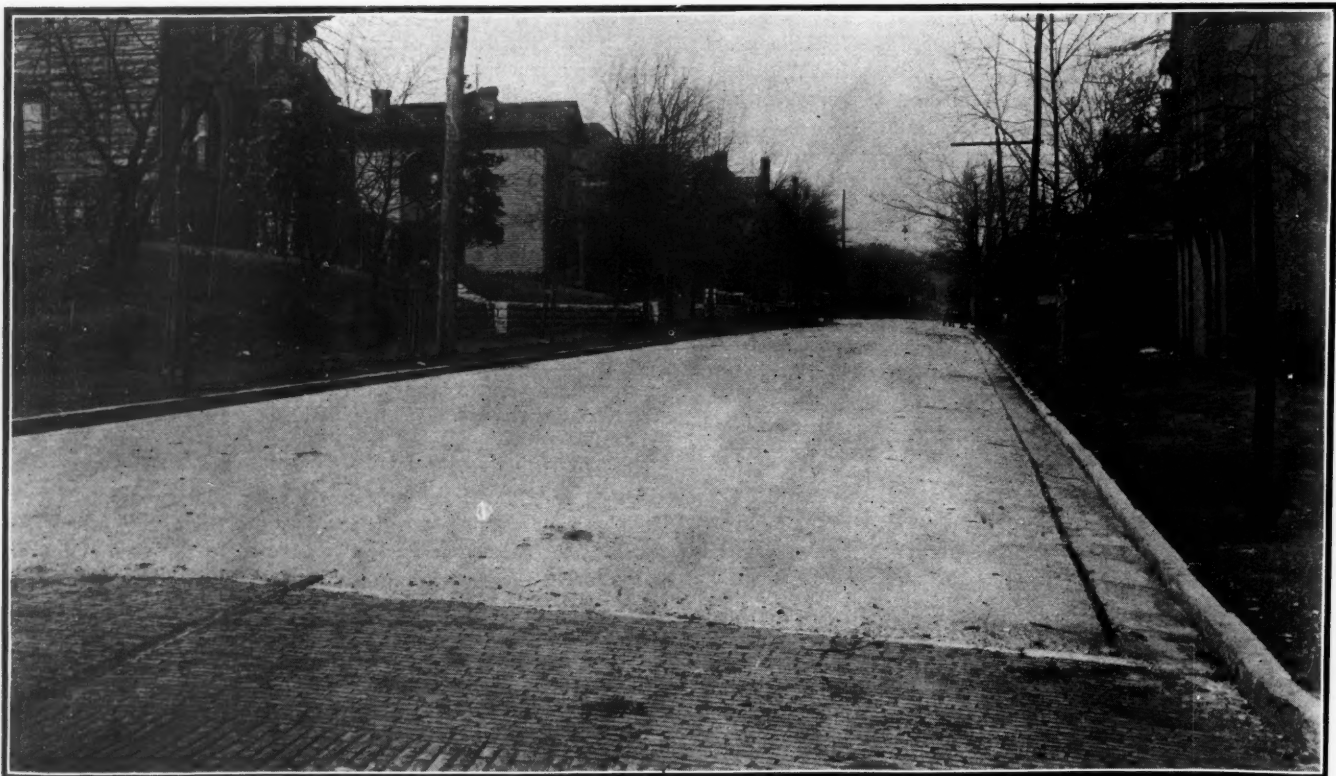
SOME very interesting and instructive remarks on street maintenance and chert roadways appeared in the last report of City Engineer Robert Hooke, of Chattanooga, Tenn., and we have attempted to present these that other city engineers and officials may profit by the experience of Mr. Hooke.

STREET MAINTENANCE

In November, 1900, the Board of Public Works began making necessary repairs of asphalt pavements with its own workmen, purchasing the asphalt mixture from one of the asphalt companies. This material was reheated by means of the Combined Fire Wagon and Asphalt Mixture Heater designed by Mr. Hooke, and when the six tons of material at first purchased became exhausted, old material that had been used on the streets was substituted. The greater part of the repair work for two years was done with this material. How

hired to make them. In two years the repairs amounted to 1,032 square yards and when the old material was used cost from 65 to 70 cents per square yard, including labor and material. With new material the cost has been about \$1.25 per square yard. The total cost of maintenance since the expiration of the guaranty has averaged \$0.0136 per square yard per year. The cost of maintaining one street (Market) for a period of seven years averaged \$0.023 per square yard per year. The cost of maintenance steadily increases every year until a complete renewal is made on the surface.

"The probable length of time the several asphalt pavements laid during the period of 1888-1892 can be used before repaving becomes necessary, is now an interesting and important question. These pavements are from ten to fourteen years old and the total area of the annual repairs may become so extensive that further repair work



CHERT PAVING ON PINE STREET, CHATTANOOGA

the material is treated is given in Mr. Hooke's words thus: "The old asphalt is broken into fragments, measuring three or four inches in their longest dimensions and placed in the pan of the heater, which is previously about half filled with water, boiled and steamed until it is softened and disintegrated, when about a gallon of residuum oil is added to the batch of material and uniformly distributed through it by turning the material with shovels. The material is then removed from the pan to the hole or holes in the pavement to be filled, when by means of rakes, tampers and smoothers the work is finished in a manner similar to that pursued by the workmen of asphalt paving companies on similar work."

New paving material is heated in the wagon with less water and no oil. This method of maintaining the asphalt pavements has proven very satisfactory, has been inexpensive, and the repairs have been made with a promptness not attainable in case companies were

will cease to be economical and a complete renewal of the asphalt service will be required." Mr. Hooke thinks the life of the asphalt pavements should be from fifteen to twenty years. In endeavoring to arrive at a method for determining the question of economy of too lengthy repairs, he says: "The question whether it is more economical to renew entirely the wearing surface of an asphalt pavement when it reaches that age when it may be considered an old pavement, and when holes begin to appear with frequency, or to continue the use of the old pavement after that period by resurfacing from time to time the worn out portions, will depend upon the cost per year of the asphalt surface up to the age limit mentioned, as compared with the cost per year of keeping the surface in repair after the age has been reached. The question may be considered mathematically as follows:

"If we assume the limit of an asphalt wearing surface to be twelve

years, during which period the cost of repairs has been moderate, but beyond which time the pavement may be considered an old one requiring frequent patching to maintain it, then the cost of the asphalt surface per annum during the twelve years will be made up of three items, namely: First, the annual interest on the original cost; second, a sum, which, if set aside each year and invested at compound interest, would be sufficient at the end of the period to equal the original cost; and third, a sum which, if invested each year from the beginning, would cover the cost of maintenance through seven years following the expiration of the contractor's five-year guaranty. Denoting these several amounts by a , b and c , respectively, and i for the rate of interest, we shall have the value of b in per cent. of the original cost of the asphalt surface for the twelve-

$$\text{year period: } b = \frac{100}{(1+i)^{12} - 1} i$$

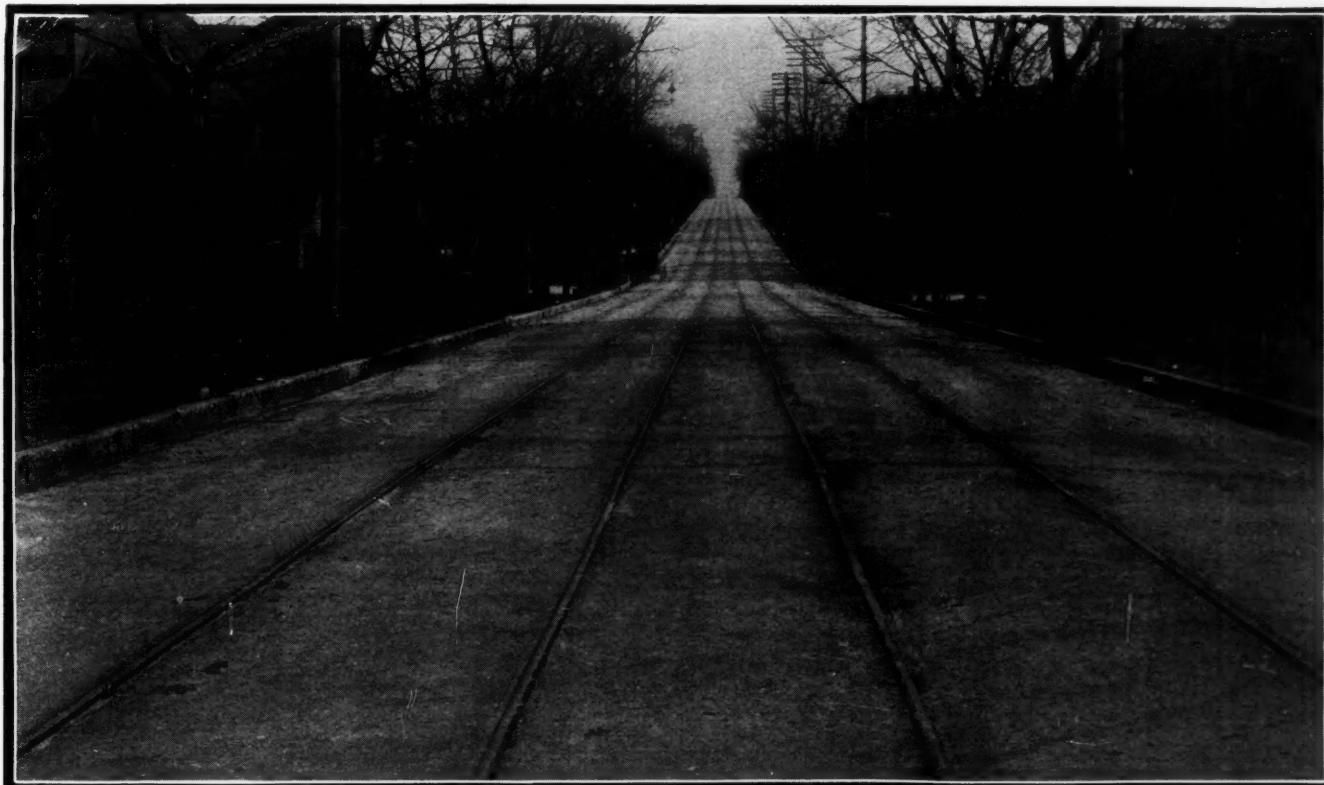
"If the rate of interest be 4 per cent., the total annual cost will be 11.15 per cent. of the original cost. If the rate be 5 per cent. the total cost will amount to 11.72 per cent.

"The values of a , b and c for an asphalt pavement that has been in use for fifteen years are as follows: a equals 4 per cent., b , 5 per

says that it depends on the tonnage of traffic per unit of surface to which the materials are subjected. Water and atmospheric changes have little effect on paving brick and the life of the pavement is reduced by traffic alone. Asphalt, on the other hand, is greatly affected by water and atmosphere, while traffic assists in preserving it. Asphalt pavements that are little used deteriorate much faster than those on which traffic is greater, for the rolling of the wheels compresses the asphalt, increasing its density and making it more impervious to water. On this account Mr. Hooke considers that brick is preferable for lightly traveled streets. Of course traffic does not increase the durability of asphalt indefinitely, a limit being reached where the surface is worn away faster than the increase due to compression of traffic.

CHERT ROADWAYS

There are now in Chattanooga an aggregate of 9.46 miles of chert roadways. The average cost of this pavement laid on over thirty streets during the past four and one-half years was 48 cents, including the cost of grading, but not that of curbing and gutters. The foundation is composed of furnace slag which is cheaper than crushed stone and almost as satisfactory. About six inches of the slag is laid and between three and four inches of the chert. When the sur-



CHERT PAVING IN A CHATTANOOGA STREET AFTER THREE AND ONE-HALF YEARS OF WEAR

cent., and c assumed at 0.8 per cent. making the total annual cost 9.8 per cent. of the original. With money at 5 per cent., this cost becomes 10.43 per cent."

Mr. Hooke thinks that it will not be advisable to remove entirely the asphalt wearing surface after a period of twelve years if the cost per annum for maintenance after that period is less than 11.15 per cent. with money at 4 per cent., or less than 11.72 per cent. with money at 5 per cent., of the cost of complete resurfacing. If the life period is fifteen years the other percentages given above would obtain. Even before these limits are reached the condition of the street necessitates resurfacing and 8 per cent. would be a better limit. Often, however, certain portions of the street give out before others, and could be resurfaced in advance of the rest.

Regarding the relative durability of asphalt and brick, speaking from the experience he has had with both materials, Mr. Hooke

face of the street is below what would otherwise be the subgrade of the roadway, the slag is applied in deeper layer but not over fifteen inches. It has been found to be as economical to do the entire filling with slag as to use earth and properly compact the same. The fragments of chert over two inches in greatest diameter are raked to the top and broken up. Then a road roller thoroughly compacts the chert and a hard, even surface is obtained. Extra chert is piled on the walks to raise such low places as may develop in the rolling. If the chert has insufficient moisture to enable the rolling to compact it, it is sprinkled late in the afternoon and left until the next morning when it is ready for rolling. From a statement prepared by Mr. Hooke showing the chert roadways constructed from 1898 to 1902, it appears that the cost of laying ran from 8.2 to 21.6 cents per square yard with the average given above. The estimated value of the prison labor employed was 50 cents a day for each prisoner.

The work of restoring street surfaces after pipes are laid or repaired is not done properly, according to Mr. Hooke, unless the city men do the work. The plumbers or men hired are not skilled enough or do not take the necessary care or time to do the work properly. It is impracticable for Chattenoga to keep men for this work because there is not enough of it to do and if they were employed on other work, something important might be under way when their services would be required to relay pavements after openings were made. Therefore, it seems better to him to allow the plumbers to relay the pavement and then, three or four times a year send a gang of men around to properly relay the pavement where necessary. Each master plumber should be required to keep on deposit with the Board of Public Works a certified check for \$25 as a guaranty to restore the streets properly or that he will pay the bills rendered by the board.

Virginia Regulates Franchise Grants

THE Legislature of Virginia has recently passed an act to regulate the granting of franchises by cities and towns. The act provides that before any franchise may be granted to use public property, except in the case of a trunk railroad, the city or town must advertise the ordinance making the grant once a week for four successive weeks in a newspaper of the place. The advertisement must invite bids for the franchise, which shall be sold to the highest responsible bidder, on whom will fall the cost of advertising. At the time of opening the bids they must be read aloud for public information. The council shall have the right to determine the one to whom to award the bid, and may select a lower bidder if it considers that the public interests are better served by so doing, or it may reject all the bids. The bids are to be referred to a committee and such other investigation may be taken as the council men deem proper before the franchise is awarded. If the grant be made to a lower bidder the reason for doing so must be expressed in the subsequent ordinance granting the franchise. If no bid is submitted at all, the council may pass an ordinance granting the franchise to any person making application therefor and executing a bond in favor of the municipality conditioned on the putting into operation and maintaining the plant or plants provided in the franchise. The mayor must sign said ordinance before it may become effective.

This act covers also any amendments or extensions of any franchise that are now in existence or that may be hereafter authorized, which extends or enlarges the same either as to the time it is to last or the territory in which it is to be enjoyed. Such extension or amendment must be advertised in the same manner as obtains in the case of new franchises. Any person or corporation that shall occupy or use the streets or public property of any city or town in a manner not permitted to the general public, without having first obtained a franchise from or consent of the council of the municipality, shall be guilty of a misdemeanor and be subject to a fine of from \$5 to \$50, each day's continuance being considered a separate offense.

Quincy's City Engineer Recommends

THE use of automatic flush tanks for sewers is recommended strongly by City Engineer Hancock, of Quincy, Ill., those already in use having worked most satisfactorily. Such tanks should be placed at the dead ends of all sewers. The cost of water for the tanks for the year amounted to \$299.20, and no better investment could be made by any municipality than the construction of automatic flush tanks where needed.

Some of the brick pavements are wearing out, and Mr. Hancock advocates the resurfacing of them with rock asphalt. He is certain as to the result, but as others are not, recommends that a sample stretch be laid as an experiment. Some samples of water pipes have been taken to show the destruction that has been wrought by electrolysis, and the City Engineer urges the Council to provide for an investigation of all the service pipes in the city. This should be done, too, that the committee that is to make an estimate of the value of the system as it may affect the estimate to be made by many thousands of dollars.

Statistics of Arc Lighting in United States Cities and Towns

	Population.	No. lamps.		Watts at lamp terminals.		Schedule.	Hours burn per year.	Coal, per ton.	Contract price per lamp per year.
		Open.	Closed.	Open.	Closed.				
MISSOURI (Concluded)									
Louisiana	5,131	33	6	340	...	(2)	2,250	\$2.00	\$80.00.
Malden	1,462	13	...	340	...	(3)	2,190	3.00	.....
Marshall	5,086	40	...	480	...	(2)	....	1.10	60.00.
Maryville	4,577	...	39	...	430	(2)	2,179	2.50	96.00.
Memphis	2,159	21	...	340	...	(2) (3)	1,220	2.60	60.00.
Milan	1,757	29	...	480	...	(2)	2,179	1.60	36.00.
Moberly	8,012	41	...	480	...	(2)	2,179	1.75	80.00.
Monett	3,115	17	...	480	...	(1)	4,000	1.50	.....
Monroe City ..	1,929	17	...	480	...	(2)	2,250	2.25	72.00.
Nevada	7,461	...	50	...	430	(1)	4,000	1.35	85.00.
Norborne	1,189	13	...	340	...	(3)	1,643	2.00	96.00.
Palmyra	2,323	10	...	480	...	(3)	2,000	2.25	100.00.
Plattsburg	1,878	26	...	480	...	(2) (3)	1,220	2.25	60.00.
Poplar Bluff ...	4,321	24	...	340	...	(2)	2,200	2.80	84.00.
Rich Hill	4,053	28	...	480	...	(1)	4,000	1.40	80.00.
Richmond	3,478	24	...	480	...	(3)	1,825	1.65	180.00.
Springfield ...	23,267	152	...	480	...	(2)	2,878	2.20	77.50.
Tarkio	1,901	...	11	...	550	(2) (3)	1,220	2.10	72.00.
Trenton	5,396	35	3	340	...	(1)	4,000	2.60	90.00.
Warrensburg ..	4,724	38	...	480	...	(2)	2,600	2.25	75.00.
MONTANA									
Anaconda	9,453	68	...	480	...	(1)	4,000	...	180.00.
Billings	3,221	51	...	340	...	(1)	4,000	2.00	80.00.
Bozeman	3,419	26	2	340	...	(1)	4,000	2.75	25-135 3-120
Butte	30,470	...	158	...	430 480	(1)	4,000	3.75	132.00.
Deer Lodge ...	1,324	20	...	480	...	(1)	4,000	3.25	150.00.
Great Falls ...	14,930	55	25	480	430	(1)	4,000	W. P.	85.00.
Helena	10,770	79	...	340	...	(1)	4,000	W. P.	90.00.
Livingston	2,778	20	...	480	...	(1)	4,000	4.00	150.00.
Phiipsburg	995	12	...	480	...	(1)	4,000	Wood	144.00.
NEBRASKA									
Alliance	2,535	14	...	210	...	(2) (3)	1,220	3.50	75.00.
Beatrice	7,875	25	...	480	...	(1)	4,000	2.75	126.00.
Blair	2,970	...	11	...	430	(3)	2,700	2.66	36.00.
Chadron	1,665	...	10	...	550	(4)	1,567	3.60	84.00.
Columbus	3,522	16	10	340	...	(3)	1,825	3.50	100.00.
David City	1,845	23	...	340	...	(2) (3)	1,220	3.50	72.00.
Falls City	3,022	...	14	...	430	(2) (3)	1,220	2.50	z
Hastings	7,188	...	95	...	430	(2)	2,250	3.55	z
Holdrege	3,007	2	1	...	...	(2)	2,190	3.00	108.00.
Kearney	5,634	...	13	...	430	(1)	4,000	(5)	120.00 106.20
Lincoln	40,169	308	25	480	430	(2) (3)	1,700	2.50	.....
McCook	2,445	...	5	...	...	(4)	2,190	3.25	120.00.
Omaha	102,555	...	432	...	430	(1)	3,800	2.00	114.50
Pawnee City ...	1,969	18	...	480	...	(2) (3)	1,220	3.25	z
Superior	1,577	20	...	480	...	(3)	2,000	W. P.	72.00.
York	5,132	...	25	...	...	(1)	2,000	2.50	120.00.
NEVADA									
Carson City ...	2,100	20	2	480	...	(1)	4,000	...	120.00.
Reno	4,500	23	...	340	...	(1)	4,000	8.25	84.00.
Virginia City ..	2,695	2	...	...	...	(1)	4,000	W. P.	240.00.
NEW HAMPSHIRE									
Berlin	8,886	...	56	...	480	(1)	4,000	W. P.	50.00.
Concord	19,632	126	...	340	...	(1)	4,000	W. P.	75.00.
Derry	3,600	31	...	340	...	(2) (3)	1,220	4.75	63.50.
Dover	13,207	133	...	340	...	(2) (3)	1,220	...	67.00.
Exeter	4,284	...	77	...	430	(2)	1,800	4.50	71.50.
Franklin Falls..	5,846	62	...	340	...	(3)	2,007	W. P.	50.00.
Keene	9,165	...	55	...	430	(1)	4,000	3.60	100.00.
Laconia	8,042	...	85	...	340	(1)	3,860	W. P.	75.00.
Meredith	800	17	...	340	...	(3)	1,825	5.35	70.00.
Nashua	23,898	230	...	340	...	(1)	4,000	4.90	112.00.
Newport	3,500	21	...	340	...	(3)	1,825	(5)	50.00.
Portsmouth	10,637	110	1	340	...	(1)	4,000	4.00	105.00.
Raymond	1,500	...	9	...	...	(2) (3)	1,220	4.45	75.00.
Rochester	8,466	98	...	340	...	(2) (3)	1,220	...	67.00.
Somersworth ...	7,023	74	...	340	...	(2) (3)	1,220	...	67.00.
Tilton	2,000	...	28	...	430	(3)	2,000	W. P.	70.00.
NEW JERSEY									
Asbury Park ..	4,148	375	...	340	...	(1)	4,000	3.07	85.00.
Atlantic City ..	27,838	300	...	480	...	(1)	4,000	3.55	105.85
Bayonne	32,722	139	...	480	...	(1)	4,000	3.05	100.00.
Belvidere	1,784	51	...	340	...	(2)	1,179	2.00	65.00.
Bloomfield	9,668	78	...	340	...	(1)	4,000	3.25	72.00.
Boonton	3,901	23	...	340	...	(1)	4,000	2.25	83.00.
Bordentown	4,110	28	1	480	...	(1)	4,000	2.75	100.00.
Camden	75,935	466	...	480	...	(1)	3,772	2.77	120.45
Dover	5,938	...	12	...	...	(1)	4,000	2.25	70.00.
Egg Harbor	1,808	23	...	480	...	(2) (4)	1,800	3.10	63.60.
Elizabeth	52,130	104	...	340	...	(1)	4,000	2.95	100.00.
Flemington	2,145	46	...	340	...	(3)	2,100	2.20	55.00.
Guttenberg	3,825	18	...	480	...	(1)	4,000	3.10	100.00.
Hackensack	9,443	...	150	...	430	(1)	4,000	2.60	84.00.
Haddonfield ...	2,776	29	...	480	...	(1)	3,650	2.85	110.00.

(1) All night. (2) Moon scale. (3) Midnight. (4) Up to 1 or 2 A. M. The difference in time may be judged from the column showing number of hours lamps burn. (5) Water power and steam. z Municipal plant.

The data given in the above table were collected by the General Electric Company, Schenectady, N. Y.

(To be continued.)

NEWS AND PRACTICE AMONG THE CITIES

City Departments Should Pay for Water—Wide Tire Law in Chicago—No Municipal Light for Cleveland—Georgia Mayors Meet—Municipal Uniform Accounting Urged

Berlin to Have Cheap Electric Light

It has been announced by a local paper that the price of electric light in Berlin, Germany, will be reduced 27 per cent. on January 1, 1904. The present price is 13.1 cents per kilowatt-hour, and this will be lowered to 9.5 cents to compete with gas light. This will make the price of electricity in Berlin lower than that in any large German city.

Chicago Has Wide Tire Law

AFTER considerable opposition on the part of certain aldermen, the Council of Chicago passed an ordinance for wide tires. Several years ago the fight for such an ordinance was introduced by Alderman Williston, but it was not possible to pass it until the present. The ordinance provides that the widths of tires shall correspond to the weight in pounds which the wagon is to carry as follows: 2,000, one inch; 3,000, one and one-half inch; 4,000, two inches; 5,000, two and one-half inches; and so on up to 20,000 pounds, each additional 1,000 pounds requiring one-half inch more of tire. On all two-wheeled wagons the tires shall be double those specified to the same weight. Concave or convex tires are prohibited, only the flat or single-faced being allowable. The penalty is a fine of from \$10 to \$50.

Rockford to Build Large Sewer System

THE greatest sewer problem that the city of Rockford, Ill., has met is being solved by a large trunk sewer system that City Engineer Edwin Main has planned and will see to its conclusion. Increased health, the growth of certain portions of the city, and better land values will be the main results of this undertaking. The new system with all the laterals will amount to about four miles, but they will be four miles in the right place and health officers and residents of the section to be benefited are confident that it will be much easier to stamp out contagious and other diseases when the drainage has been secured. The problem of draining the section has long been discussed and many engineering difficulties had to be met, but City Engineer Main has overcome them all. He was appointed in 1897 and was about to resign to go with a brick company, but was persuaded to remain until the work was accomplished which is looked for in October, 1904.

The Highways of Russia

THE systematic administration of highways in Russia only commenced in 1817. Between that date and 1833 it is calculated that the length of highways was 2,001 miles. On an average ninety-six miles of new highways were added every year. From 1836 to 1855 4,286 miles, or an average of 214 miles, of new roads were constructed. From 1856 to 1875 there were added 214 miles, or an annual average of nearly thirty-eight miles. From 1876 to 1895 2,105 miles were added, or an annual average of 105 miles. From 1896 to 1899, 640 miles were added, or an annual average of 160 miles. This gives a grand total of some 9,364 miles of new roads constructed from 1817 to the end of 1899. It is calculated that 7,453 miles are maintained by the state under the Minister of Highways and Communications; 2,038 miles are maintained by the provinces, with the assistance of the state; and 121 miles are kept up by the communal authorities at their own cost. The cost of construction of the highways, including the purchase of land, has of late varied from \$4,800 to \$14,363 per mile. The maintenance of the state roads has cost about \$340 per mile per annum. For the year 1901 the state budget included a sum of \$11,229,200 for highway service, of which \$3,345,400 was for new roads, \$1,537,000 for reconstruction, \$1,795,200 for maintenance, and \$582,000 for grants to the provincial governments.

Municipal Lighting Plant Doing Well

THE first annual report of the municipal lighting plant at Richmond, Ind., covers but ten months of the workings of the plant, but the results are very satisfactory considering the newness of the plant. The receipts for light and power amounted to \$18,262.21; the city loaned the plant \$17,900, and the sale of supplies brought in \$410.32, making \$36,672.53. Of this amount, \$18,362.21 were actually earned. The expenses include new construction, actual maintenance and supplies. The total cost of meters, wire and equipment of every sort amounted to \$18,204.02 and the actual maintenance, including coal, payroll, repairs, etc., was \$17,170.70. This gave a surplus of receipts over expenses of \$1,191.51. The amount of work necessary to extend the lines, equip houses, etc., accounts for the deficit of some \$17,300, but this expense, having been incurred, will not be repeated for some time, and the income will gradually wipe it out. The increase in patrons, it is expected, will soon place the plant on a paying basis.

No Municipal Lighting Plant for Cleveland

AFTER all efforts to secure for Cleveland, O., a municipal electric lighting plant that was promised to the citizens before the last election, Mayor Johnson has suffered a severe defeat to his project at the hands of the Council, which would not appropriate the necessary \$200,000. The vote failed by three to be the necessary two-thirds, these three being members of Mayor Johnson's own party and who had promised to favor the plant during the municipal campaign. On June 29 an ordinance unanimously passed the council providing for the issue of bonds to build the plant which was to be "a municipal electric light and power plant," but an injunction was obtained by interested parties restraining the issue of the bonds on account of the word "power" in the ordinance. The claim was made that the new code did not allow power plants to be built by cities. A new ordinance was then prepared which did not contain the objectionable word, although identical with the old ordinance in every other respect. When this came up for passage, it was voted down as stated. The fact that the special committee of the Chamber of Commerce reported against the plant was spoken of by Mayor Johnson as not being the sense of the whole body as was demonstrated some time ago when the special committee recommended a franchise for a street railroad while the general body voted against it.

Second Annual Meeting of Georgia Municipal League

THE second annual meeting of the League of Georgia Municipalities was held at Macon on August 12-13, and proved to be a most instructive as well as a most enjoyable meeting. Four sessions in all were held, and at them, in addition to reports from the officers, were read the following papers:

"Light and Water Rates," by Hon. J. F. Rhodes, mayor of Athens; "Sewers and Sanitation," by Dr. W. F. Brunner, health officer, Savannah; "Taxation and Assessments," by Hon. Clifford Walker, mayor of Monroe; "Municipal Ownership," by Hon. L. H. Chappell, mayor of Columbus; "Pauper Transportation—Its Abuses and the Remedy," by Hon. Herman Myers, mayor of Savannah; "The Importance of Municipal Courts in Preventing Crime," by Hon. Chas. A. Picquet, recorder of Augusta; "Boards of Health, City, County and State," by Dr. R. B. Barron, chairman, Board of Health, Macon; "Veteran's Licenses, Abuse and Remedy," by Hon. W. B. Hollingsworth, mayor of Fayetteville; "Vagrants, A Rigid Enforcement of the Law," by Hon. Evan P. Howell, mayor of Atlanta; "Shade Trees, Planting and Growing," by Hon. P. H. Lovejoy, mayor of Hawkinsville; "Encouragement to Capitalists to Locate in Georgia," by Hon. Edwin Brobston, Brunswick; "Legislation and City Government," by Hon. John K. Davis, mayor of Cedartown; "Benefits

of a Uniform Schedule of Licenses," by Hon. Julius A. Horne, mayor of Milledgeville. The last session was devoted to off-hand talks on paving, garbage disposal and other questions.

Reviews were held at the police and fire departments of Macon, and the visitors were royally entertained. The following officers were elected: President, Hon. Bridges Smith, of Macon; first vice-president, Hon. J. F. Rhodes, of Athens; second vice-president, Hon. James R. Atwater, of Thomaston; third vice-president, Hon. R. E. Allen, of Augusta; fourth vice-president, Hon. Z. V. Peacock, of Cochran; secretary-treasurer, Hon. David J. Bailey, of Griffin.

Urge General System of Vaccination

THE scourge of small-pox still hovers over many cities, waiting for the city authorities to relax their vigilance, so as to carry off its victims. Despite the many objections to the method, the great majority of health officers and physicians are satisfied that the only way to effectually rid the country of this dread disease is by systematic and general vaccination, compulsory, if necessary. An open letter to the citizens of Hamilton, O., from the Board of Health is strong in its defense of vaccination and cites many instances where general vaccination has wiped out small-pox. The German army and Sweden are examples not to be ignored. Many times physicians do not diagnose the disease correctly, mistaking other eruptive diseases of the skin for small-pox.

A similar letter from Director of Public Safety M. E. Edgar, to the people of Scranton, Pa., urges the co-operation of all physicians, clergymen, employers of many hands, and citizens in general to see that all within their influence are vaccinated until it "takes." Free vaccination stations are open to those who cannot pay for it. While the character of the disease in Scranton has been of a mild form, unless the disease is entirely stamped out, there is the uncertainty when an epidemic of violent disease may arise. The demoralizing effect of an epidemic on business should bring home to all business men the necessity of doing what they can to secure a universal system of vaccination.

Street and Sewer Work in Springfield

The streets of Springfield, Mass., are looked after in a little different way than those in many other cities in that there is a superintendent of streets and sewers entirely independent of the city engineer's office. He looks after the maintenance of the streets after the city engineer and his assistants have constructed them. The watering of the streets is also done under Superintendent of Streets Arthur A. Adam's supervision. During the past year 74½ miles of streets were watered. The use of sprinkling cars, as adopted in 1901, was discontinued and eight new sprinkling carts were substituted.

The work of the city engineer's department, of which Mr. Charles M. Slocum has charge, has been different from that of most recent years in that no contract work of any amount was performed and the time was given to miscellaneous tasks that had been postponed in favor of more important work during the past year. The card index has been employed for a few years for the recording of the general system of bench elevation. Much of the work during the past year was devoted to correcting these figures and they will be ready for any work in the future and will save great time and expense when any engineering work on the streets is to be done. City Engineer Slocum states in his report that a 17-inch dumpy levelling instrument was employed for this bench work and had an inverting eye piece with a power of about thirty-five diameters. It also had a level sufficiently sensitive to indicate five seconds in an arc for every one-tenth inch run of bubble. He urges that a map be made of the city and should be founded on an accurate triangulation. In speaking of the widening of Plainfield street he states that the roadway, including the street car tracks, was paved with Syracuse vitrified brick laid on a six-inch concrete base with a one-inch sand cushion and the joints of the brick were filled with pitch. About 10,000 yards were laid at a cost of about \$2.50 per square yard. A large amount of sewer work must be done in replacing the old pipe systems, the appropriation for the past year not having been as large as usual. These old sewer pipes have caused considerable trouble because of the fact that they have become obstructed, the ingrowth of tree roots often cutting off nearly the entire capacity of the pipe.

City Departments Must Pay for Water

"THERE is nothing more essential to man than an abundant and permanent supply of pure, wholesome water." Such is the estimate of the Board of Water Commissioners of Middletown, N. Y., and on this account in April, 1900, a filter plant was instituted to secure such a supply. Its operation has been successful and all objectionable color, odor and taste has been removed from the water. Middletown, like many other cities, has had trouble with electrolysis of its water pipe system and a year ago in August the water board employed an electrical engineer to make a thorough examination of its system to determine whether the same conditions which were found to exist three years previous still existed, or to what extent they had been checked. It was found that while the conditions were not as bad as three years before they were still serious. Much of the trouble had been obviated because the railroad company had made better bondings of its tracks.

Last year the water commissioners came to the conclusion that it was not fair to supply water to public buildings and schools of the city without having credit for the same and so all the public buildings were metered and the board of education and other departments were rendered an account each month and attempts were made to collect for the water supplied. Thus far the board has not been able to collect any of the bills, but the same will appear in their accounts as credits. The rates for metered water for manufacturers run from fifteen cents per 100 cubic feet for 1,667 cubic feet or less per month, to four cents per 100 cubic feet for 30,000 cubic feet or over. Fifty per cent. discount is allowed for bills paid within sixty days, and to other meter users, from the above rates, twenty-five per cent. discount. The minimum meter rate is seventy-five cents per month. Owing to the suit brought against the city by a citizen because the brook running through her land was polluted by the wash water from the filter, it was necessary to construct a settling basin in which this wash water can be run, after which it can be drawn off slowly, thus preventing the filtrate from running into the brook.

Recommends Uniform Municipal Accounting

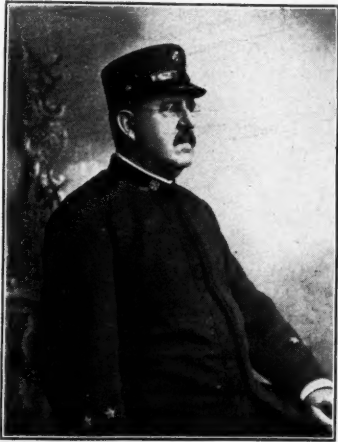
THE Wisconsin State Tax Commission, in referring to municipal taxation, reported that improvement in this direction will depend on the character of the administration of the city's finances and a full knowledge of the precise financial conditions of each city. At present the tax on real estate is used almost entirely for local purposes, the expense of the state being met almost exclusively from the tax on corporations. In 1902 this latter tax amounted to \$2,200,674.19. The wants of cities are increasing so rapidly that a higher taxation or increase in bonded indebtedness will be necessary. The assessment of property at about its cash value has permitted of larger bonding and the constitutional debt limit of 5 per cent. is no longer a safeguard against extravagant indebtedness. The Commission does not think that it would be practicable to fix a tax rate on a lower debt limit that would be uniformly applicable to all cities without crippling some of them. To reduce the debt limit from 5 to 2½ per cent. would seriously injure those cities in which the assessed valuation had been raised fairly high.

Regarding a uniform system of municipal accounting, the report says:

"The present outlook for good, sound municipal financing is not as encouraging as could be wished, and the situation is viewed with considerable alarm by many residents of the cities. While a uniform debt limit is hardly feasible at the present time some steps toward a better system of municipal finance and accounting seem highly desirable and would operate as a salutary check on excessive taxation. . . . Dissatisfaction with existing conditions has led in other States to much hasty and ill considered legislation to remedy the evils complained of, and there seems to be necessity for careful study of existing charter laws to determine what changes are required to secure better and more scientific municipal government. The expenditure of public funds is so intimately related to and connected with the important question of taxation that we feel impelled to call attention to the defective methods of accounting which appear to prevail in many of the cities of the State, and to the necessity for a system of uniform accounting of receipts and disbursements."

BALTIMORE'S FIRE DEPARTMENT

Force Is Well Equipped and Manned—Combination Chemical Engine, Hose Wagon and Ladder Truck Proves Valuable—Some Fine Stations



CHIEF G. W. HORTON,
Baltimore, Md.

IN the first pages of this issue was given a description of many of the city departments of Baltimore; it remains to give our readers some idea of the fire department of that city. This department is the most important of the Department of Public Safety, and is under the control of a board of commissioners who direct its affairs, but leave the actual fire fighting to the chief, George W. Horton, who is the executive head.

The history of the fire-fighting forces of Baltimore dates back to 1763 with the formation of the Mechanical Fire Company. At various dates later on, up to 1829, other fire companies were formed. In 1834 the United Fire Department was organized, the Mechanical Fire Company having agreed with the United Fire Department that all the other companies assist one another, instead of fighting, as was too often the case. While perfect accord was not secured at once, the mutual interest of all the companies later prevented the former disturbances. In 1859, February 15, the apparatus of all the companies passed under the control of the Baltimore City Fire Department. The services of the volunteers were fully recognized and the thanks of the city were given them by resolution of council. A number of the volunteer firemen naturally entered the ranks of the paid department. The department has grown with the needs of the city until it is to-day one of the best in the country.

THE MANUAL FORCE AND APPARATUS

At the present time there are twenty-three engine, eleven hook and ladder, and three chemical engine companies. The manual force amounts to 420, including the chief, six engineers and a superintendent of machinery. The salaries paid seem small in comparison with those obtaining in other cities. The Chief Engineer receives \$2,000 per annum; district engineers and superintendent of machinery, each

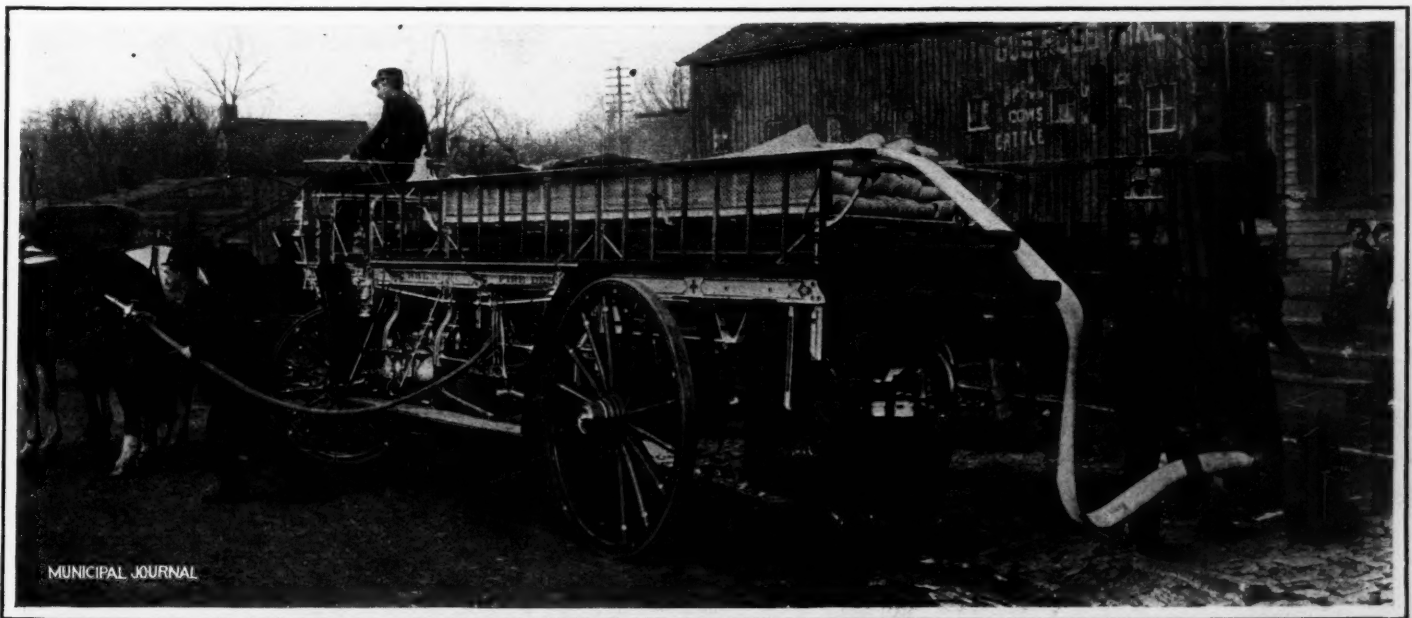
\$1,400; captains of engine and hook and ladder companies \$1,100; lieutenants of the same \$1,000; enginemen \$1,100; assistant enginemen, tillermen, hostlers, captains of combination hook and ladder companies and captains of chemical engine companies, each \$900; hostlers of chemical engine companies, hostlers of combination hook and ladder companies, pipemen and laddermen, each \$800; pilots \$1,000; stokers \$800, and probationers \$500. The salary list is fixed



ONE OF BALTIMORE'S NEW FIRE HOUSES

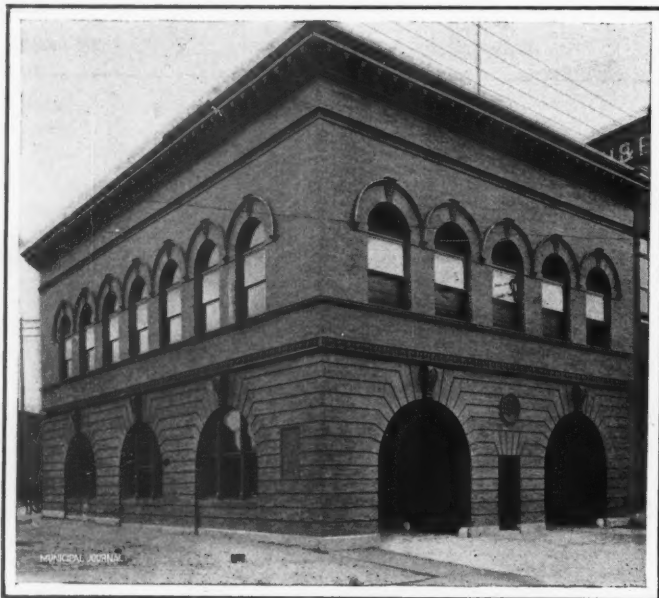
by law and was \$374,392.21 in 1902. The commissioners receive salaries of \$1,000 a year.

The apparatus in service consists of twenty-two steam fire-engines, twenty-two combination chemical engines and hose wagons, eighteen hose carriages, one water-tower, a fire-boat, eight aerial trucks of the Hayes pattern, three combination truck and chemical engines, one bank ladder truck, two chemical engines, seven Concord wagons used by the officers, a wagon for the use of the Superintendent of Ma-



COMBINATION CHEMICAL ENGINE, HOSE WAGON, AND LADDER TRUCK

chinery, three wagons used by the linemen of the telegraph department, one large wagon for use of the construction work of the telegraph department and three carriages for the use of the Board of Fire Commissioners and Superintendent of Telegraph. The apparatus already in service consists of six steam engines, two Hayes trucks, a water-tower, two combination hose wagons, four Concord wagons, five chemical engines and a truck for moving disabled apparatus. Seventeen of the engines were built by the La France Engine Company, five by Clapp & Jones and the rest by other makers. The chemical engines were manufactured by the Holloway Company, of Baltimore. The greater part of the hose in service con-



HOME OF NO. 11 TRUCK—ERECTED, 1901

sists of fabric hose, although there are a few feet of gum hose. The total number of hydrants in service is 2,703.

The condition of the apparatus in the service is of the best, the necessary repairs and improvements having been made and eight of the trucks having been equipped with Browder life-saving nets. The department has a total of 190 horses in service, of which number 157 are in use by the several companies, twenty-one are assigned to the officers and fire alarm department and twelve are held in reserve.

CHEMICAL ENGINES PROVE VALUABLE

The department finds that one of the most useful parts of its apparatus is the combination truck, an illustration of which is shown. This, as will be seen, consists of a wagon rigged with ladders, two

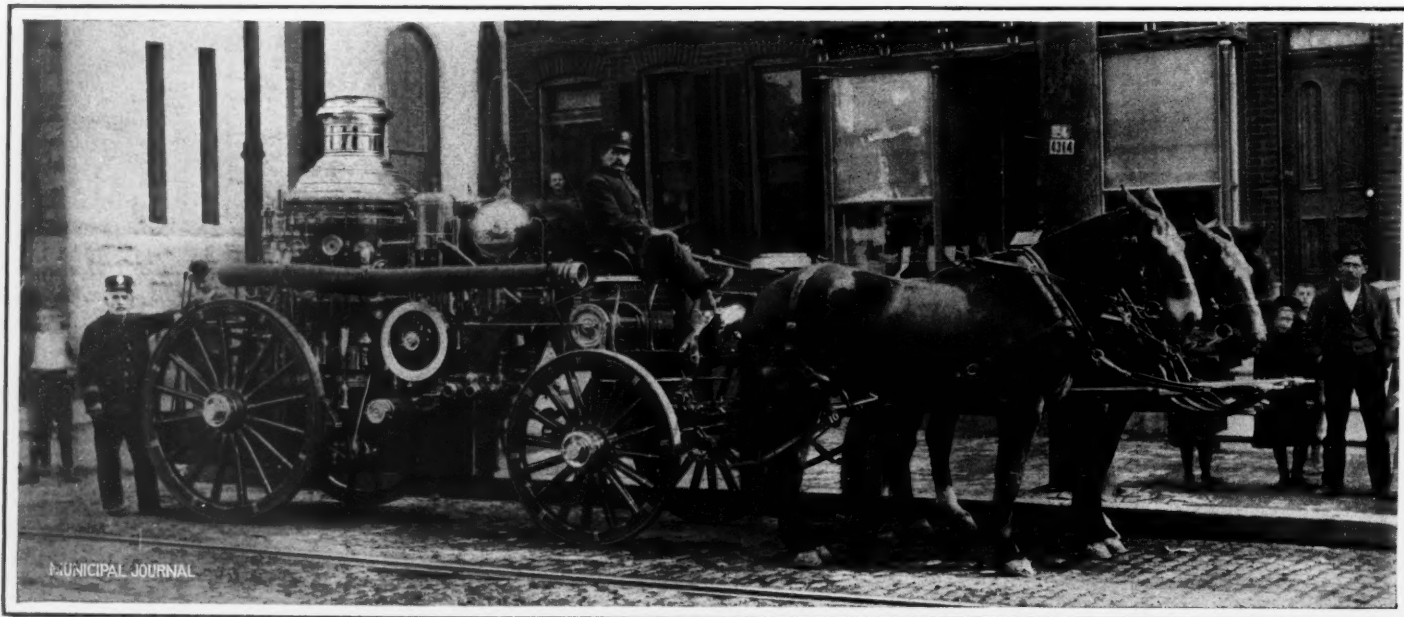
chemical tanks and about 750 feet of two and one-half-inch hose together with hose for the chemical tanks. They have proven very valuable for the outlying districts where there are many dwellings and where the water pressure is sufficient without the assistance of a steam fire-engine. The combination hose wagons carry 1,000 feet of fire hose and are equipped with two thirty-five-gallon chemical tanks, with 250 feet of chemical hose. As in other departments, these chemical engines are proving that they are one of the most useful pieces of apparatus any city could have. Statistics from the different departments show that each year more and more of the fires are extinguished at the outset by these chemical engines, and they are proving an investment that amply repays their small first cost.

The houses of the different companies compare favorably with those in the fire department of other cities. Two of our illustrations show samples of the houses that are being erected at the present time. Every convenience and everything that will make the life of the firemen a pleasant one while not fighting fires is included in these modern houses. Of course there are a number of the older houses which are not as pleasant as those which are being built now, but in time the department will replace all of the old ones with up-to-date structures.

During 1902 the department received 1,547 alarms, of which 984 were box alarms and 435 silent; one hundred and twenty-eight alarms, termed special, were from fires that were extinguished by others than the members of the department, but were inspected by the department to see that they had been entirely put out. This total number of alarms shows an increase of forty-nine over the previous year, but the total loss was much less than that of 1901. The greatest large fire loss that the department has reported was in 1901, when it amounted to \$1,499,119.90, and the smallest was in 1861 when it was placed at \$60,000; but it is probable that the latter was greater for there was little means then of getting at the actual damage sustained. In 1902 the loss was estimated at \$670,614.61.

WORK OF FIRE ALARM TELEGRAPH

The work of the fire alarm telegraph department is most important and has shown its efficiency on many important occasions, such as times of severe storms when the apparatus inside and out was damaged. The prompt arrangement of the force on such occasions and the energetic efforts made, served to remedy the damage and prevented all but minor interruptions of the alarm circuits. In comparison with the service of the private telegraph companies, the department shows its great superiority for the number of breaks in the lines are very much less and the trouble much more quickly remedied than in the case of private concerns. On outside overhead work a covered wire has been used exclusively. This prevents a number of crosses with other wires. When the plans of the electrical commission are completed the department will be enabled to place



ONE OF BALTIMORE'S BIG ENGINES

many of its wires underground in the conduits and remove many poles from the streets. The service that is at present underground has been satisfactory, the only trouble being from the high potential currents that leak from their conductors.

In June, 1902, a storage battery was installed and this has given every satisfaction and materially improved the service. The municipal telephone exchange continues to give the usual satisfaction to the several departments for whose convenience the service was installed.

After a service of twenty consecutive years or in case of disability, the members of the department can be pensioned on half time. In case of sickness or apparent disability from accidents, the members are placed in care of the department's surgeon, at the city's expense, and receive their salary during all this time. In case of death from accident, the heirs or representatives are paid by the city \$500, and from insurance—the premium of which is paid by the city—an additional \$500 is paid. This relief fund was started in a way, back in the early volunteer days, but when the paid department went into service the relief fund was reorganized to fit the needs of the regular men. The average time off for the men during the year amounts to about fifty days, this being without loss of pay.

Close relations exist between the fire department and the several city departments with which it comes in contact. Thus the inspector of buildings, who has charge of the building and repairs to the station houses, has greatly aided in modernizing the houses when repaired and in extending facilities that tend not only to greater comforts for the men, but also the readier handling of apparatus and horses. The engineer of the water department is also a very necessary adjunct to that of the fire service. The new hydrants installed by the water department are so made that they cannot be lifted by the frost, inasmuch as they taper from top to bottom, being eight inches in diameter at the top and ten inches at the bottom. The waterway main valve closes with pressure and not against and the drip valve does not open until the main valve is closed and closed before the main valve is opened. The whole interior working parts can be taken out without removing the hydrant.

Force, Equipment and Maintenance of Fire Departments

	Total No. Men.	No. Engines.			No. Hose Wagons.	Feet of Hose.	No. Horses.	Cost of Maintaining Department.
		Steam.	Chemical.	Combination and Hose wagon.				
New York, N. Y.	6,505	167	11	4	83	170	411,700	981
Chicago, Ill.	1,216	102	17	10	34	115	202,695	481
Philadelphia, Pa.	844	50	6	44	17	14	105,000	326
St. Louis, Mo.	516	48	1	28	15	25	97,650	247
Boston, Mass.	790	52	13	12	21	48	121,611	374
Baltimore, Md.	408	27	8	26	14	18	74,969	188
Cleveland, O.	426	32	3	2	9	32	46,050	165
Buffalo, N. Y.	486	33	7	4	11	30	96,250	258
San Francisco, Cal.	457	52	9	1	10	56	79,500	285
Cincinnati, O.	334	31	1	16	45	65,000	174	472,388
Pittsburg, Pa.	416	32	4	6	9	26	106,480	183
New Orleans, La.	302	28	13	1	8	27	35,823	153
Detroit, Mich.	495	28	6	8	13	19	76,360	201
Milwaukee, Wis.	337	23	8	2	9	23	62,375	175
Washington, D. C.	252	16	3	2	7	19	57,000	138
Newark, N. J.	234	22	3	10	8	10	38,000	109
Jersey City, N. J.	190	15	3	3	7	15	25,929	77
Louisville, Ky.	241	18	1	3	5	17	30,050	107
Minneapolis, Minn.	306	22	10	8	7	18	42,876	169
Providence, R. I.	246	9	1	9	10	12	33,000	90
Indianapolis, Ind.	193	11	3	1	8	21	42,000	106
Kansas City, Mo.	194	8	1	2	8	17	30,200	81
St. Paul, Minn.	198	15	4	1	8	18	50,200	119
Rochester, N. Y.	200	8	2	1	7	13	35,200	85
Denver, Colo.	202	8	1	3	4	14	17,000	67
Toledo, O.	135	8	1	10	5	9	32,000	73
Allegheny, Pa.	110	11	1	1	4	17	31,500	69
Columbus, O.	118	14	2	5	6	11	27,800	88
Worcester, Mass.	229	7	3	1	4	17	27,200	72
Syracuse, N. Y.	138	9	1	3	3	7	18,950	66
New Haven, Conn.	120	11	1	3	4	8	23,734	59
Paterson, N. J.	103	9	1	1	3	9	15,000	52
Fall River, Mass.	191	6	3	1	4	12	25,450	58
St. Joseph, Mo.	60	2	1	2	2	14	12,500	35
Omaha, Neb.	119	4	2	2	4	12	19,803	48
Los Angeles, Cal.	120	13	2	10	4	10	19,000	77
Memphis, Tenn.	90	9	2	1	1	8	15,981	51
Scranton, Pa.	135	6	2	2	2	12	8,000	52
Lowell, Mass.	175	6	2	2	6	13	28,150	54

Albany, N. Y.	173	11	..	8	4	13	13,500	57	142,048
Cambridge, Mass.	125	8	2	7	3	7	14,250	37	91,120
Portland, Ore.	218	10	4	..	6	11	22,900	61	80,563
Atlanta, Ga.	108	5	2	..	3	9	20,000	44	117,768
Grand Rapids, Mich.	128	9	2	..	4	12	25,405	58	122,518
Dayton, O.	108	6	..	11	4	3	33,200	56	74,792
Richmond, Va.	120	8	..	3	3	6	16,000	45	92,673
Nashville, Tenn.	85	8	2	3	2	9	12,450	54	89,270
Seattle, Wash.	98	7	2	2	4	9	22,000	44	97,377
Hartford, Conn.	135	10	1	2	3	8	19,000	47	116,305
Reading, Pa.	3,326	10	2	9	3	7	16,610	55	42,022
Wilmington, Del.	481	8	2	1	2	7	14,800	36	36,510
Camden, N. J.	72	5	2	..	3	7	12,000	31	86,208
Trenton, N. J.	72	7	1	1	4	7	15,050	30	72,900
Bridgeport, Conn.	119	7	..	3	2	9	15,000	36	75,614
Lynn, Mass.	169	7	4	1	2	11	27,850	50	96,740
Oakland, Mass.	129	9	3	1	3	11	19,450	47	76,575
Lawrence, Mass.	66	6	2	3	3	4	18,000	37	59,530
New Bedford, Mass.	220	8	..	4	3	7	18,000	45	78,738
Des Moines, Ia.	84	..	3	5	3	6	15,950	43	80,670
Springfield, Mass.	185	6	2	3	6	10	24,000	63	97,390
Somerville, Mass.	104	3	1	2	3	6	9,350	38	64,943
Troy, N. Y.	996	9	..	1	3	11	23,200	37	64,421
Hoboken, N. J.	65	5	1	..	2	4	8,450	22	82,856
Evansville, Ind.	67	5	2	..	2	10	12,000	33	60,406
Manchester, N. H.	198	7	1	..	4	6	25,450	41	88,791
Utica, N. Y.	65	5	1	3	2	3	14,000	32	75,665
Peoria, Ill.	141	3	1	2	2	9	23,163	33	62,419
Charleston, S. C.	99	10	1	..	3	10	9,207	30	48,200
Savannah, Ga.	81	7	2	2	3	10	17,365	42	76,812
Salt Lake City, U.	38	2	1	1	2	4	11,150	21	43,051
San Antonio, Tex.	74	4	1	1	1	6	10,000	30	43,973
Duluth, Minn.	87	5	7	..	4	10	20,650	49	87,775
Erie, Pa.	72	6	1	1	1	8	19,450	41	52,752
Elizabeth, N. J.	460	7	..	..	2	7	5,000	26	25,688
Wilkes-Barre, Pa.	116	5	1	4	2	4	17,500	27	35,937
Kansas City, Kan.	45	1	..	2	2	5	11,400	22	40,251
Harrisburg, Pa.	1,513	5	..	2	1	9	10,500	27	20,039
Portland, Me.	202	7	1	1	5	12	32,000	38	60,815
Yonkers, N. Y.	767	..	..	5	5	14	18,200	27	48,657
Norfolk, Va.	52	5	1	3	2	6	10,000	30	46,411
Waterbury, Conn.	160	2	..	1	2	5	9,700	18	34,777
Holyoke, Mass.	133	6	2	1	3	6	23,300	37	73,330
Ft. Wayne, Ind.	57	7	1	..	2	8	13,450	42	55,811
Youngstown, O.	37	1	..	4	2	2	7,250	16	35,324
Houston, Tex.	63	7	1	2	2	5	13,450	32	63,749
Covington, Ky.	33	3	1	..	2	5	4,000	14	33,530
Akron, O.	58	6	1	4	2	2	6,850	23	40,505
Dallas, Tex.	53	4	2	..	3	6	10,000	33	50,071
Saginaw, Mich.	47	1	..	..	2	9	21,300	26	30,131
Lancaster, Pa.	48	6	..	..	1	5	5,000	17	15,297
Lincoln, Neb.	30	3	1	..	3	3	6,950	23	29,039
Brockton, Mass.	79	5	3	..	3	5	12,340	35	54,665
Binghamton, N. Y.	549	2	1	..	2	6	7,500	21	26,512
Augusta, Ga.	60	7	1	..	2	6	8,300	26	52,973
Pawtucket, R. I.	56	2	..	6	3	1	14,400	21	38,430
Altoona, Pa.	47	3	..	..	2	7	8,000	22	24,058
Wheeling, W. Va.	36	4	1	6	1	..	7,800	26	42,347
Mobile, Ala.	26	3	..	..	2	5	8,000	13	23,914
Birmingham, Ala.	46	4	1	1	1	4	8,000	24	38,345
Little Rock, Ark.	33	3	1	1	2	6	4,200	20	28,742
Springfield, O.	35	2	1	1	2	7	9,000	25	27,645
Galveston, Tex.	52	2	1	..	2	6	9,200	24	51,724
Tacoma, Wash.	47	6	2	..	3	7	15,600	33	46,934
Haverhill, Mass.	109	5	..	3	3	9	16,825	39	48,953
Spokane, Wash.	63	4	2	3	2	3	11,700	30	67,185
Terre Haute, Ind.	51	2	1	..	2	7	9,000	28	39,983
Dubuque, Ia.	37	3	1	1	2	4	7,300	21	32,361
Quincy, Ill.	42	5	1	1	1	5	7,000	28	28,499
South Bend, Ind.	42	..	1	1	2	6	12,725	21	33,648
Salem, Mass.	107	4	1	..	2	5	19,250	28	35,395
Johnstown, Pa.	565	8	..	..	1	14	15,900	34	10,200
Elmira, N. Y.	41	6	..	4	2	1	8,150	20	54,343
Allentown, Pa.	929	6	2	2	1	5	9,650	30	18,744
Davenport, Ia.	35	..	..	1	2	6	8,605	19	25,046
McKeesport, Pa.	27	..	..	..	2	4	7,500	12	33,498
Springfield, Ill.	65	4	2	3	2	4	7,500	30	44,617
Chelsea, Mass.	76	3	1	1	1	6	10,100	18	34,408
Chester, Pa.	395	3	..	1	1	3	6,000	14	15,699
York, Pa.	915	6	1	3	1	2	8,500	22	14,037
Malden, Mass.	62	2	3	1	2	3	12,350	22	34,391
Topeka, Kan.	29	1	2	27	1	6	8,000	18	28,303
Newton, Mass.	93	3	2	..	2	8	17,589	38	56,222
Sioux City, Ia.	51	1	3	1	2	5	9,700	21	29,631
Bayonne, N. J.	600	7	1	1	2	10	6,000	18	13,893
Knoxville, Tenn.	33	3	..	..	1	4	5,450	14	22,636
Schenectady, N. Y.	241	1	..	1	1	4	8,400	14	20,086
Fitchburg, Mass.	95	2	1	2	3	5	14,000	20	30,247
Superior, Wis.	99	2	2	..	2	7	11,950	24	37,575
Rockford, Ill.	31	3	..	4	2	1	6,350	19	27,669
Taunton, Mass.	153	3	1	1	3	8	14,100	26	27,385
Canton, O.	78	2	2	1	2	5	7,000	20	36,534
Butte, Mont.	29	..	1	1	2	4	8,250	15	38,940
Montgomery, Ala.	30	3	..	..	2	5	6,300	16	27,130
Auburn, N. Y.	38	1	1	..	1	4	6,350	12	20,516
Chattanooga, Tenn.	54	5	1	4	1	2	9,000	23	35,120
E. St. Louis, Ill.	25	..	..	2	1	4	7,550	11	27,277
Joliet, Ill.	29	2	3	1	1	5	8,100	22	29,097

Policemen Not Laborers

It has been decided by the Superior Court of Savannah, Ga., that the salaries of the city policemen are subject to debts that they incur. It was claimed that the policemen are laborers and coming under the head of laborers or journeymen mechanics, their salaries could not be attached, but the court held that by no means could they be so classified and consequently were required to meet their obligations from their salaries. The fact that a policeman has to exercise judicial function in deciding whether a law has been violated shows that his duties require intellectual ability and mental work and so he is not a laborer.

CONVENTION OF FIRE CHIEFS

Will Meet at Atlantic City—Large Attendance Expected—Interesting Papers to Be Read

THE thirty-first annual convention of the International Association of Fire Engineers will be held at Atlantic City, N. J., the eighth, ninth and tenth of this month. The meeting place will be at Marine Hall, on Young's Ocean Pier, and the first session will commence at eleven o'clock on the morning of the eighth. Secretary Hills has stated that the topics to be presented and discussed are to be as follows:

1. Should firemen be members of labor unions?—Chiefs A. J. Harris, Tampa, Fla., and John Thompson, Toronto, Ont.

2. Explosive compounds other than gases. How should they be stored and in what quantities?—(To be announced later.)

3. Deadly fumes from acids and other chemicals. How better to protect the lives of brave firemen from their dangerous effects when engaged in fighting fires?—Chief Henry S. Yates, Schenectady, N. Y.

4. Should the chief have absolute command of the fire department?—Capt. William Brophy, Boston, Mass.

5. Fireproof construction and does it afford added fire protection?—Hon. Perez M. Stewart, former superintendent of buildings, New York City, N. Y.

6. First aid to the injured at fires. Can firemen be instructed so as to render such aid and should they not be so instructed?—Chief Edward H. Mersch, Evanston, Ill.

The report on topic No. 3, read by Mr. Henry E. Hess, manager New York Fire Insurance Exchange at the last convention, "Are cities and towns keeping pace with improvements in fire protection in proportion to the increase of the conflagration hazard?" was referred to the following special committee, which is expected to present its report at this convention: Chiefs Edw. F. Croker, New York City; W. T. Cheswell, Boston, Mass.; W. H. Musham, Chicago, Ill.; Chas. S. Swingley, St. Louis, Mo.

It is stated that heretofore many of the chiefs attending the conventions have expressed regret that certain subjects they wished discussed they had not brought before the convention. It is hoped, by the officers, that every chief will feel free to present for discussion any question in which he is interested. A circular has been issued to the authorities of the cities and towns urging that they send their chiefs of the fire departments to the convention. It says in part:

"It is impossible to estimate the importance and value of this organization to the fire chiefs, and all those interested in the protection of property from fire. There is brought together at these meetings representative men from all sections of the United States and Canada who exchange their views, narrate their experiences, and discuss methods of prevention and extinguishment of fire.

"Whether the chief receives a salary or not, the necessary expenses for attending should be defrayed by the cities and towns, because of the benefit derived thereby, better qualifying him to serve his department. He gains by observation a knowledge of the latest improvements in fire apparatus, and from the wisdom and experience of others becomes familiar with the most approved methods of extinguishment of fires."

The exhibits at the convention will be interesting; all the latest improvements since the last convention will be on view.

The secretary has issued a circular giving the names of the railroads making reduction in fares for the benefit of the members of the association. The list is as follows:

The New England, Trunk Line, Central Traffic and Southeastern Passenger Associations have granted a one and one-third fare for round trip.

The following instructions are issued by the railroad associations:

"A reduction of fare and one-third, on the certificate plan, has been secured for those attending the meeting of the International Association of Fire Engineers, Atlantic City, N. J., September 8-11.

"The following directions are submitted for your guidance:

"1. Tickets at full fare for the going journey may be secured within three days (exclusive of Sunday) prior to and during the first three days of the meeting.

The advertised dates of the meeting are from September 8 to 11, consequently you can obtain your ticket not earlier than September 4, nor later than September 9. Except from stations where it is possible to reach place of meeting by noon of September 10, tickets may be sold for morning trains of that date. Be sure that, when purchasing your going ticket, you request a certificate. *Do not make the mistake of asking for a receipt.*

"2. Present yourself at the railroad station for ticket and certificate at least 30 minutes before departure of train.

"3. Certificates are not kept at all stations. If you inquire at your station you will find out whether certificates and through tickets can be obtained to place of meeting. If not, agent will inform you at what station they can be obtained. You can purchase a local ticket thence, and there take up a certificate and through ticket.

"4. On your arrival at the meeting present your ticket to Mr. Henry A. Hills, secretary.

"5. It has been arranged that the special agent of the Trunk Line Association will be in attendance to validate certificates on September 10. *A fee of 25 cents will be collected for each certificate validated.* If you arrive at the meeting and leave for home again

prior to the special agent's arrival, or if you arrive at the meeting later than September 10, after the special agent has left, you cannot have your certificate validated, and consequently you will not get the benefit of the reduction on the home journey. *No refund of fare will be made on account of failure to have certificate validated.*

"6. So as to prevent disappointment, it must be understood that the reduction on return journey is not guaranteed, but is contingent on an attendance of not less than 100 persons holding certificates obtained from ticket agents at starting points, showing payment of full first-class fare of not less than 75 cents on going journey; provided, however, that if the certificates presented fall short of the required minimum, and it shall appear that round trip tickets are held in lieu of certificates, they shall be reckoned in arriving at the minimum.

"7. If the necessary minimum is in attendance, and your certificate is duly validated, you will be entitled up to September 15 to a continuous passage ticket to your destination by the route over which you make your going journey, at one-third the limited fare."

The headquarters of Secretary Hills will be at the Grand Atlantic Hotel during the convention.



PRESIDENT EDWARD F. CROKER,
International Fire Chiefs' Association

WHAT POLICE AND FIREMEN ARE DOING

Work of London Firemen—Report of New York's Force—A Suggestion for Firemen—Cleveland Police Salaries—Fire and Police Personals

Disciplining Richmond Firemen

THE recent railway strike at Richmond, Va., caused trouble for several of the city's firemen. The Board of Fire Commissioners has taken severe measures to discipline the members of the department who talked on the side of the strikers or openly expressed their sympathy with the rioters. A truck driver was charged with using language unbecoming an officer on a train between Old Point and Richmond when he spoke of Chief of Police Amos in an uncompromising way and criticised Mayor Taylor and the soldiers. Witnesses proved the charges and a fine of \$100 was imposed. Two other firemen were fined \$20 and \$10 for saying that they would refuse to turn the hose on a mob if ordered to do so. All firemen who are suspected of assisting the rioters will be compelled to stand trial before the commissioners.

How Firemen Could Pass Their Time

A WAY in which the idle time of the members of the fire companies might be profitably employed was illustrated by the men in Engine 2, St. Paul, Minn. There was a vacant lot next to the engine house in which was thrown all manner of refuse and from which most disagreeable odors arose, and which made the life of the firemen, especially at night, anything but a pleasant one. This spring the members determined to clean up the place and have succeeded in turning the once dumping ground into a delightful little park in which on summer nights the men can sit, and which will make their life much more pleasant. The other departments assisted the firemen in fixing up the place, loaning them the necessary tools and supplying the earth. Flower beds were laid out and flowers purchased by the men, and the men have taken a pride in the spot and will keep the little park in good condition. It is probable that other engine companies will follow suit and the plan may be adopted by the police.

New Salaries for Cleveland Police

AN ordinance to fix the salaries and bonds of the members of the Cleveland, O., police department has passed by the Council of that city and provides that the chief of police shall receive \$3,500 a year and give bond for \$5,000; that there shall be an inspector with a salary of \$2,400 and bond of \$5,000, to act as deputy to the chief. The other members of the department and salaries are: Secretary, \$1,800, bond \$5,000; surgeon, \$1,500, bond \$1,000; four captains with salaries of \$1,500 each, and bonds of \$5,000; twenty-eight lieutenants, \$1,200 each, bonds at \$1,000; twenty-eight sergeants, \$1,100 each, bonds \$1,000; 370 patrolmen at \$780 each for the first year's service, \$840 for the second year's service and \$1,000 for the remaining years of service. The chief is to have the power to detail not more than twenty patrolmen as detectives when the same shall receive salaries of \$1,200 while so serving. There are to be four matrons appointed by the mayor at salaries of \$666.66 each; an electrician at \$1,200 and a number of minor employees. The positions of telegraph operators are to be filled as far as possible from patrolmen who are disabled.

Hamilton's Departments Reorganized

THE first steps were recently taken by the Council of Hamilton, O., to place the police and fire departments on the classified basis as required under the new code. The ordinances that directed the changes provided that salaries and bonds of the members of the fire department should be as follows: Chief, \$100 per month, bond \$4,000; a marshal, \$65 per month, bond \$2,500; twenty firemen, \$55 per month, with bonds of \$2,000 each; four substitutes to receive the same salary when on duty as the regulars, and to give the same bonds. The police department is to be composed of: A chief at \$80 a month, with bond of \$4,000; an inspector of police at \$75,

bond \$3,000; twenty patrolmen at \$60, bonds \$2,000; and two substitutes with the same salary as regulars when on duty and to give the same bond. There will also be two police clerks at \$65, bonds \$2,000; two patrol drivers at \$60, bonds \$2,000; and a police surgeon at \$100 a year, with a bond of \$500.

The positions of runner and ladderman have been abolished and a less number of stationary men have been substituted. Eleven runners, a captain of truck and four laddermen will lose their positions and in their places will be placed fifteen auxiliary men. The fire marshal will serve as an assistant to the chief. Under the old system there were seventeen stationary firemen; under the new there will be twenty-one exclusive of the chief.

New Kind of Searchlight

A STORY comes from Rochester, N. Y., to the effect that one of the residents of that city has invented an instrument for the purpose of illuminating buildings that are on fire. It consists of a lantern of peculiar construction in which a torch powerful enough to light up the street and buildings and to enable the firemen to see who they are doing. The light is of an intense whiteness and can penetrate smoke readily. The firemen will not have to depend on the flames to see the situation. By lighting the torch at once upon reaching the scene of a fire at night, they will be able to see if people on the upper floors are in need of assistance. Each company will thus be supplied with what is practically a searchlight.

Use of Chemicals Growing

THERE were 413 alarms of fire in Lowell, Mass., during the past year, and of the fires that took place, 230 were extinguished by chemicals and only ninety-seven by water, showing that the use of the chemical engine should be and is being extended. The loss from water, far greater than that from the fire on which it is used, is being gradually reduced. The protective department, which is maintained by the city and consists of six permanent men, aided largely in the reduction of water damage. The department is composed of eighty-three permanent men and ninety-three call men, divided into six engine, five hose, four hook and ladder and a protective company. Chief Edward S. Hosmer is at the head of the department, receiving a salary of \$2,000 a year. He is assisted by a paid assistant and three call assistant engineers. The permanent men in the department receive \$2.75 a day, the foremen \$3, and the engineers of steamers \$3 a day. The apparatus consists of six engines, four one-horse and seven two-horse hose wagons, a Babcock aerial truck and three other trucks, two chemical engines, a water tower, a patrol wagon and eight fuel wagons. The whole amount of loss was \$110,843.06, with a valuation of \$1,182,392.99, and a loss above insurance of \$2,367.42.

Sturgis Reports on His Department

THE annual report of Fire Commissioner Thomas Sturgis of New York, for 1902, shows that during that year there were in Manhattan and the Bronx 5,640 fires involving a loss of \$4,283,111 which is \$1,297,724 less than the losses for 1901. Mr. Sturgis, in reviewing the work of the department, touches on the trial and dismissal of Chief Croker, stating that "his removal lifts a baneful influence from the department, and now that both favoritism and tyranny are removed the efficiency and contentment of the force will be increased in that degree which naturally results from opening the prizes of the firemen's profession to every man who merits them, without fear, favor of invidious preference."

The Commissioner states that a number of men in the department were purposely passed over when promotions were to be made by the preceding administration and that he invited all such members to

present in writing the facts that he might right the wrong done. As a result of this, a deputy chief, two battalion chiefs, five foremen and ten assistant foremen were promoted.

In the boroughs of Manhattan and the Bronx the personnel aggregated 1,753 of which number 1,493 were of the uniformed force. There were seventy-five engine companies and twenty-five truck companies, three water-towers, four fire-boats included in the number of engine companies, four combination chemical engines and hose wagons and three chemical engines. There were 24,554 alarms answered, giving an average of 248 for each company; the average number of fires at which each company performed duty was eighty-five.

In Brooklyn and Queens boroughs there are 1,251 men of which 1,127 are uniformed. The engine companies number sixty-three and the truck companies, nineteen. There are three chemical engines, two fireboats and a water-tower. The alarms numbered 3,091.

New Platoon System for New York Police

THE six-platoon patrol system for the New York police that Commissioner Greene inaugurated some time ago has not worked as well as he thought, and the Commissioner has been trying to remedy the difficulties, always keeping in mind the comfort of the men. He recently issued a new schedule that keeps the essential principles of the old one, but will give the men better hours. In every three weeks one Sunday will be given for off-duty for thirty-two hours, one Sunday with twenty hours on duty, and one Sunday of sixteen hours on duty. The schedule is: First day—Eight hours patrol, four hours off, eight hours reserve, and four hours off; sixteen working hours, eight of which is on patrol and eight hours off.

Second day—Eight hours patrol duty and sixteen hours off.

Third day—Same as the first.

Sundays—Two sections will work twenty hours each, consisting of eight hours patrol, four hours reserve and eight hours patrol. The two other sections will perform two four-hour tours of reserve and an eight-hour tour of patrol. The other two sections will be off duty for thirty-two hours from midnight Saturday to 8 o'clock Monday morning.

Work of London Firemen

THE report of the Metropolitan Fire Brigade, of London, Eng., shows what the firemen in the largest city in the world have been doing. The report is compiled in a manner different from that usually adopted by chiefs of fire departments in America. More attention is given to the number of lives lost or saved, and the way in which it was done. A great many details are given of the fires that occurred, as well as how they were extinguished, and a separate table has been compiled of the most notable fires. The report shows that the number of fires amounted to 3,574 during the year, being 110 less than the number in 1901. The fires that have been classed as serious declined in number from ninety-nine to seventy-six, or 2.126 per cent. of the total fires. The way the serious fires are distinguished from others is in the amount of water used to extinguish them. How much water is necessary to mark a serious fire is not stated. The reduction in the number of fires is explained by the promptitude by which a large number of men and apparatus can be concentrated at a fire.

Of the 422 persons whose lives were endangered by fire, 116 died from injuries, suffocation, burns, shock, etc. While every case is recorded where death could be traced to these causes, many suffered death that could not have been saved by the brigade. Many of the saved owed their lives to the timely arrival of horsed escapes, which have been succeeding the hand-drawn escapes stationed in the thoroughfares. Many more alarms are sent in by telephone or street fire alarms than previously, and the brigade hopes that prompt calls will be sent in at every outbreak of fire.

The last sentence of the report will cause amusement in many sections. The authorities find it necessary to call attention of the public to the fact that there is no charge attached to services of the brigade in connection with saving life or extinguishing fires, except in the case of chimney fires. There seems to be a misapprehension in certain quarters that made necessary this statement. Captain Wells asks that the press will call the attention of the citizens to the

number of fires due to carelessness, such as children playing with matches, lamp accidents, etc.

At the present time the strength of the brigade is reported as follows: The staff consists of 1,285 men, including one chief, one second and one third officer, six superintendents, seven district officers, and seventy-seven station officers; 159 first-class, 143 second-class, 615 third and fourth-class firemen, and thirty-six men under instruction. The large amount of apparatus includes seventy-two steam fire-engines, fifteen hand fire-escapes stationed in the street, six hose cart and hand fire escapes stationed in the streets, a fire float and five steam fire-engines on barges, twenty-one hand engines, 107 hose carts and tenders, eight hose and ladder trucks, twenty long fire ladders, 178 hand fire escapes, sixty-seven ladder vans, four steam tugs, forty-two and one-half miles of hose, 288 horses, etc.

Police and Fire Personals

—Chief of Police James H. King, of Stonega, Va., was shot and killed in a raid upon a band of alleged moonshiners.

—Jos. H. Fowler was elected chief of the fire department of Bordentown, N. J., and Charles E. Burr and Louis Rittenger made first and second assistants respectively.

—Jos. R. Williams, chief of the Buffalo, N. Y., fire department, in 1874-5, died in New York the latter part of July, from injuries received a short time before by being run over by a heavy wagon.

—Mayor Smith has chosen as chief of the Canton, O., police department, Fred. S. McCloud, one of the three successful applicants who passed examination recently. Chief McCloud has been in the police department for twelve years.

—Major Edward Hughes, Lexington's (Ky.) veteran fire chief, was run over and killed on July 19th by a trolley car. Major Hughes was one of the best known fire chiefs in the country and had served as head of the Louisville fire department for twenty-five years until retired on half pay.

—The Police and Fire Commission of Superior, Wis., has been probing the efficiency of Fire Chief Johnson. The chief had been charged with poor handling of several fires that occurred recently, in one instance witnesses claiming that the engines were not properly located at the fire in a lumber mill.

—Mayor Howell, of Atlanta, Ga., is of the opinion that good men ought not be compelled to "scramble around for two years" to hold their offices on the police force. Men who have a pull with the commissioners are accused as being the ones who force the other officers to make strenuous efforts to keep their positions. He says that those who are once discharged from the force ought to be ineligible to be placed on the force.

—Under the instruction of Chief Little, of the fire department of Rochester, N. Y., battalion chiefs have been busy inspecting the factories and large buildings in the fire districts. Chief Little is urging this important work with all possible speed. The battalion chiefs are expected to make full reports of the buildings they inspect, showing the number of entrances and exits, fire walls and auxiliary fire apparatus. The reports are filed and are to be used for reference.

—Chief Sullivan, of the fire department of San Francisco, has received the full and unqualified approval of his work by the Grand Jury. The Jury stated that it believed Chief Sullivan had brought his department up to its present high state of efficiency and commended him as honest, brave and an impartial officer and competent fireman. It sounded a warning against a possible invasion of the department by the resurrection of the old spoils system, and urged that a watchful eye be kept to guard the department from any such calamity.

—Fire Commissioner Sturgis on the last day of July promoted Deputy Chief Charles D. Purroy to the position of chief of the fire department of New York. Chief Purroy was appointed a fireman January 22, 1880; made assistant foreman in 1881; foreman in 1882; chief of battalion in 1884, and deputy chief in 1893. During the time he was deputy, Chief Purroy was frequently in command of the department for short periods and has been acting chief since December 1st of last year. During his twenty-three years of service, Chief Purroy has not had a charge of any kind preferred against him.

LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—Municipal Reports Received

Books

The second edition of *Finances of Gas and Electricity Manufacturing Enterprises*, by William D. Marks, has appeared, and will be found of the greatest benefit to those who are desirous of knowing what the price of gas and electricity should be in enabling them to determine the price by using the practical and rational methods outlined. The locality of the municipality will be of no account. Very often municipal officials are called upon to judge whether the prices for lighting offered by some company seeking a franchise or contract are just and fair, but not being engineers, are dependent upon what the companies say and the prices prevailing in other places where the conditions may not be exactly the same. By the methods given in this work each official can figure for himself what will be the proper price to pay for lighting. The second edition is larger by two chapters than the first, the subjects treated in the two new sections being "Prices of Gas in Massachusetts" and "Finances of District Heating from Electric Plants." This edition has a flexible cloth cover, contains 120 pages, and can be obtained through THE MUNICIPAL JOURNAL for \$1.

The 1903 edition of *Brown's Directory of American Gas Companies* is gotten up in the usual style, but the statistics have been brought down to date, and will prove of great advantage to those interested in the operation of gas and electrical companies throughout the country. The statistics of natural gas companies are given, as well as the towns having acetylene gas plants. This edition shows a considerable increase in the direction of acetylene gas plants, as well as in those towns having lighting by gasoline. A list of the members of the American Gaslight Association, The Kansas Light, Water and Electric Light Association, The New England Association of Gas Engineers, The Ohio Gas Light Association, The Pacific Coast Association, The Society of Gas Lighting, The Southwestern Gas, Electric & Street Railway Association, The Western Gas Association, and the Wisconsin Gas Association are given. Some valuable data appear at the close of the volume on the transmission of gases, the products of coal distillation, solubility of gases in water, aqueous vapor in carbureted water gas; Frund's moonlight lighting scale is given also. Copies of this book may be secured through the MUNICIPAL JOURNAL AND ENGINEER for the sum of \$5.

There is a difference between the science of designing engineering structures and the art of so designing them that the first cost, maintenance and operation will be a minimum. The former is much the easier to learn than the latter, inasmuch as it consists mainly of mathematics. Experience and study are prerequisites in attaining the latter. The experience of others should always be studied where available and in *Earthwork and Its Cost*, by Halbert Powers Gillette, will be found the experience of an engineer in this important but comparatively little known branch of engineering. Contractors usually guess at the cost of excavation and a mistake on the wrong side will often involve serious loss. Therefore both engineers and contractors should keep this volume on hand for it contains not only the many notes made by the author, but such information that he has culled from the engineering press and other technical literature. He has formulated rules and stated principles for the use of others in estimating the cost of earthwork. As an instance of the need of more exact knowledge on the part of engineers in the direction of handling earthwork, the author points to the familiar statement that the cost of certain work "exceeds the engineer's estimate." He also speaks of the innumerable instances where the simple cost data are stated without the rate of wages or cost of materials. Consequently he advocates a careful training in the art of cost estimation.

He presents fifteen reasons why engineers frequently underestimate

the cost of work, the most important of them being: Failure to train students in the art of cost estimation; failure to ascertain the exact cost of materials and to appreciate the fact that changes in design will often materially increase first cost; failure to add a reasonable margin of profit especially because of the uncertain inefficiency of labor; and finally "the fixing of unit prices in a cost estimate before the specifications have been drawn." This last the author considers the least appreciated of all and a proposition which he claims has never been formulated before. Very often one engineer draws the specifications and another makes the original estimate of cost and taking the case of concrete, the one is apt to calculate on a different proportion of composition. Provisions in the specifications limiting the size of the stone to be used in the concrete often increase the amount of cement to be used per cubic yard of concrete over the original estimate because of the increased voids in the stone. This is only one example of the many miscalculations engineers are so apt to make and against which the author warns.

The book is divided into eighteen chapters that take up in succession "earth shrinkage," "earth classification," "cost of loosening and shoveling," "cost of dumping, spreading, rolling, etc.," "cost by wheelbarrows and carts," by wagons, buck and drag scrapers, wheel scrapers, elevating grader, steam shovels cars; how to handle a steam shovel plant. Chapter XIII is devoted to a summary of the preceding chapters and a table of the cost of handling earth by the various methods outlined. Then come chapters on the cost of trench and pipe laying, hydraulic excavation, dredging, and miscellaneous work. The last chapter takes up "earth and earth structures," including tables for earth pressure, effect of freezing, embankment construction, etc. In treating of the cost in the different methods of excavation rules are laid down to determine the cost and general instructions given as to the best way to carry on the work.

Three appendices are given devoted to "rapid field and office survey work," "overhaul calculation," and "a small 'home made' dipper dredge or steam shovel." An index completes the book which contains 256 pages, five by seven and one-half inches, is well illustrated and is bound in cloth. Copies may be obtained through THE MUNICIPAL JOURNAL at the publisher's price of \$2.

While each year's edition of *The Municipal Year-Book* of England must necessarily contain much matter that appeared in the previous edition, the edition for this year is appreciably larger than that for 1902, the expansion keeping pace with municipal developments. Tramways, telephone, housing and the supply of electricity necessarily show the greatest progress because of the growing interest in these subjects on the part of the municipalities. Officials in American cities who desire to know how the municipalities in England are managed and what has been done where municipal government has reached a high state of development, will find that a copy of *The Municipal Year-Book* will give them just the information they want in a concise way. Facts and figures are given that show just how the cities stand at the present time. London municipal government receives a generous portion of the book. Municipal governments in Scotland and Ireland also are given space. Separate chapters are given on supplies of water, gas and electricity, tramways and municipal telephones, and the housing of the working classes. Bound in cloth, 690 pages.

Periodicals

THE issue of *Charities* for August 1 contains a paper by Clinton Rogers Woodruff on "A More Beautiful America," in which he tells of the work of the American Park and Outdoor Art Association. He quotes extensively from a paper by Mr. G. A. Parker, superintendent of Keney Park, Hartford, Conn., regarding the great need of cities for parks. The rights of the ear and nose have been gen-

erally recognized, but that of the eye has not been so considered, and it is for these rights that the Association is fighting. The playgrounds of Washington, D. C., are described in a brief article. New York, N. Y. Price, \$2 a year.

The practical certainty of the reinstatement of the present city government in New York is claimed in a brief article in the August *Gulton's Magazine*. It is claimed that Tammany is on the defensive, and recognizes its own weakness in having no occasion to assail the administration of Mayor Low, except the statement that the present administration is just as bad as the previous one. This has, however, acted as a boomerang. The triumph of the reform administration is deserved because of its cleanliness and because it is essential to the interest of good city government everywhere. New York, N. Y. Price per year, \$1.

Municipal School Administration is the subject of an article in the *Atlantic Monthly* for July from the pen of W. H. Burnham. Boston, Mass.

The Contemporary Review for July contains an article by Robert Donald on *Municipal Affairs: The Trust or the Town*. London, Eng.

In the August issue of *McClure's Magazine*, John Mc. Palmer contributes a story called *Colonel Lumpkin's Campaign*, giving the platform of a reformed captain of industry. The "Colonel" is a fictitious character in the city of Westport, State of Winnebago, who, after making a fortune or two out of railroad deals and manipulation of railroad stock, reforms and delivers a lecture on how such things are done. He shows how the traction and other companies, after issuing as much stock as possible in excess of the actual value of the company's holdings, without the general public becoming too cognizant of the overcapitalization, "reorganize" or form another company and "merge" the two and then issue a lot of new stock to take the place of that of the companies concerned and an additional amount. Several such manipulations will greatly overcapitalize the "consolidated" company, while the real property of the company remains practically the same. The value of the franchises that the citizens give away gratis to the company is also used for capitalization purposes and the people pay the piper in high fares. The "Colonel" shows how the people are fooled into believing that railway improvements cost as much as they do. The report of the road shows high construction and maintenance accounts so as to "justify" the large capitalization. Four humorous cartoons illustrate the article. The author has succeeded in outlining the way the usual street railway is manipulated in a capital manner. New York, N. Y. Price per year, \$1.

Mayor James M. Head, of Nashville, Tenn., contributes an article on *Bitulithic Pavement in Nashville* to the August *Good Roads Magazine*, describing the experience of that city with the pavement. The first portion of *Oiled Roads and Streets*, by Theodore F. White, appears in this number, and the author tells how roads are oiled and illustrations show a road grader for oiled roads and blocks cut from oiled roads, giving an idea of how the oil forms with the road material a leathery substance on the surface. New York, N. Y. Price per year, \$1.

The Municipal Journal, of London, Eng., for July 24, outlines the scheme of the Battersea Borough Council for municipal housing of the workingmen. Illustrations are given of the workingmen's dwellings and a description of the house construction is included in the article.

The issue of July 31 has as the leading "story" an account of the *Lowestoff Municipal Tramways*, telling how the city took charge of the transportation system and giving a description of the scheme and of the several interesting features. The edition of August 7 has another leading article on tramways, this time the installation of the system at Reading being described. It shows how the city finally, after a contest, got control of the lines of the private com-

pany. An article on the *Municipal Boys' Camp* of Hull is given in this issue. The city hired boys between the ages of fourteen and sixteen years to sweep the streets which are of wood in great part. A year ago it occurred to the officials to form these boys into a club to increase the interest of the boys, and gave the boys an outing on the sea shore where a camp was laid out. London, Eng. Price per year, 8s. 8d.

The July issue of *California Municipalities* presents two interesting papers on the street paving question. *Streets and Pavements* is a paper by D. E. W. Williams, C. E., who takes up the different phases of the question, such as the need of good streets, what a good pavement is, the consideration of the cost, some general principles of roadway construction and the different road making materials. The other paper is by W. F. Raymond, on *Improved Streets and Their Repairs*. He begins with the repairs to asphalt pavements and then takes up the repairing of brick, granite and wood block, bitulithic paving, rock asphalt and flint rock macadam. He holds that many municipalities would save money if they possessed a well-equipped repair plant suitable to the kind of paving laid on the streets. San Francisco, Cal. Price, \$1 a year.

FROM the September issue of *The World's Work* we extract the following from an article by Edward Lowry:

"As showing the calibre of the men at the head of the Health Department under Tammany, it is related that a reporter who went to Commissioner John B. Sexton with a pamphlet by Robert Koch, the celebrated German specialist on tuberculosis, was greeted with this inquiry: 'Who the h— is Kotch anyway?' Michael C. Murphy, who preceded Sexton, was of the same type.

"Under Doctor Lederle it is generally conceded that this department has been thoroughly reformed and blackmailing suppressed. As showing the economies effected, this table of the cost of supplies for the department may be of interest:

		Price, 1900.	Price, 1902.
2-quart fountain syringes	Per doz.	\$18.00	\$9.18
Common drinking glasses	" "	.95	.29
10-gal. water coolers	Each	10.00	6.00
1/64-in. white rubber tubing	Per lb.	4.00	2.23
Fire hose	Per ft.	.93	.40
Eight-foot ash oars	Per pair	3.75	1.44
16-in. electric fans	Each	29.66	14.00
Galvanized netting	Sq. ft.	.12	.02½
Portland cement	Per bbl.	4.75	2.50
16-ft. rowboat	Each	110.00	47.50

"The 'graft' from the department was said to be worth \$1,500,000 a year, one of the most corruptly profitable of the branches of the municipal government."

Municipal Reports Received

MAYOR W. A. JOHNSON, of Covington, Ky., has favored us with a copy of his annual message and reports of departments for 1902. We have received a copy of the annual reports of Butte, Mont.

City Engineer W. B. Patton, of Duluth, Minn., has sent us the annual reports of his city for 1902.

We have been favored with the report of the Director of Accounts of Columbus, O.

The annual report of the Lowell (Mass.) Water Board has been received.

The sixteenth annual statement of the Street and Sewer Department of Wilmington, Del., has come to hand.

The tenth annual report of the Street and Park Commission of Manchester, N. H., has been received.

We have been favored with a report of the Fire Brigade of the London County Council for 1902.

Copies of the reports of the waterworks department of Vallejo, Cal., and of the auditor of Sacramento, Cal., have been received.

We have been favored with a copy of the abstract statement of revenue and expenditure of the Glasgow (Scotland) Corporation Tramways for 1902-3.

REVIEW OF MUNICIPAL REPORTS

Baltimore Tries Uniform Municipal Accounting—Crushing Plant Gives Satisfaction—Bessemer to Install Water Works—The Ideal Pavement

An Example of Uniform Municipal Accounting

A financial report is usually unintelligible to about 90 per cent. of all persons and the remaining 10 per cent. often find it difficult to judge of a city's condition from the average report, but if all reports of cities' finance departments were arranged according to the system used by Comptroller James H. Smith, of Baltimore, Md., the greater portion of the 90 per cent. would not find it difficult to interpret it. He adopted, as far as consistent with the laws, the system of report recommended by the National Municipal League for uniform municipal accounting. With few exceptions, the forms were used in full. The report consists of schedules each of which is divided into several parts and devoted to a separate account. The schedules appear in the order of their importance, *i. e.*, the first (A-1) is devoted to a consolidated schedule of the revenues and expenses for the year and shows the totals. The next schedule gives these more in detail and so on, each schedule being more in detail than the preceding, the order being based on the general purpose or function of each department or division of the city government. Important features of this kind of report are the emphatic distinction between ordinary and extraordinary revenues and expenses, and the distinction between revenues and expense accounts and the balance sheet accounts.

"It will be seen that the schedules progress consistently and steadily from the gross statements to the details, each schedule being an amplification of the preceding one and in complete harmony with it, and all arranged upon a definite, consistent and uniform system."

City Should Buy Asphalt Repair Plant

The past year was a very hard and expensive one in which to do street work in Rockford, Ill., owing to the great amount of rain. Every time a street was prepared a heavy rain would necessitate leaving it open for two weeks before it could be finished. There is a total of thirty-six miles of macadam streets in the city, two miles of asphalt and two miles of brick. The only change in the method of laying macadam was in the pavement of the gutters on hillsides with large flat stones. These gutters do not look as well as brick but are very much cheaper and give as good satisfaction. The cost of macadam, including the grading and curbing, amounted to 30.8 cents per square yard and \$1.266 per linear foot. The crushing plant has given good satisfaction and was run from April 11th to November 8th. There were 12,479 cubic yards of stone crushed at a cost of 47 cents a yard. As the guarantee of the company that laid the asphalt paving on two streets expires this year, the city engineer urges that the city buy a small asphalt repair plant and do all the necessary repairing itself. By this means the pavements could be repaired as soon as they showed any trace of wear. This would keep down the expense of maintenance, as asphalt pavement goes quickly after the holes become of any size.

Sewer System in Bessemer

THE sewerage of the city of Bessemer, Ala., consists of the separate system, and when completed will be 16.2 miles long and will have a capacity of 2,600,000 gallons of sewage a day, or enough for a population of 30,000 people within the territory drained. The past year, the city engineer's department has been at work on this sanitary sewer system which is to cover the entire city and will cost \$70,000. The city furnished the material for the system, and, in the opinion of City Engineer W. J. Parkes, a saving of 20 per cent. was the result.

When the city was laid out, it was provided that the alleys should be twenty feet in width and the streets and avenues eighty feet wide. Houses are numbered north and south of a central avenue, a hundred numbers to a block, and the streets are named so that the first

letters correspond to the letters of the alphabet in order of occurrence. One of the railway companies, in return for the privilege of using the street, macadamized the street from curb to curb. The sidewalks of the city are graded, curbed and charted by the city engineer's department.

A system of waterworks has been planned by City Engineer Parkes, and the latter hopes that it will be possible to install the same at an early date. The city engineer inspects all the plumbing laid in the city and asks power to condemn old plumbing that is defective. He recommends that cement walks be placed where walks are needed, that the important residential streets be macadamized and that a five-ton reversible horse roller and three-wheeled scrapers be obtained.

The Ideal Pavement

AN account of the work done on the streets of Duluth, Minn., during the past year is given in the annual report of City Engineer W. R. Patton. On one street Kettle river sandstone blocks were laid on the old telford foundation with a two-inch sand cushion and sand filler. The pavement gave satisfaction although the city engineer thinks that cement or tar and gravel filler should have been used. Superior street, which was paved in 1888 with six-inch cedar blocks with tar and gravel filler on a six-inch concrete foundation, was in good condition up to two or three years ago. When the blocks were removed it was found that they had worn down to a thickness of only two inches and that the remaining portions were still sound. Last year the street was paved with Purington brick which proved to be of uniform quality. The street railway tracks running through the street were re-laid at the time. Sixty-feet seventy-pound rails were used. These had cast-welded joints and were laid on a Lehigh and Peninsular Portland cement concrete beam. The rails were spiked to cedar ties, spaced eight feet apart, which were bedded in concrete.

Regarding the paving of avenues, Mr. Patton said in his report, "The selection of a suitable and satisfactory pavement for these avenues is beset with many difficulties. Such a pavement must present a first class foothold for horses, under all conditions, but must not be so rough as to increase to any material extent the resistance to traction or to produce unpleasant jarring of vehicles; it must be able to withstand the eroding and disintegrating action of water and weather, and must not be liable to have its particles displaced by traffic; it must be as nearly noiseless as possible, easily cleaned, composed of durable materials, easily and cheaply repaired; and of moderate and reasonable first cost. * * * A great many of the good qualities before mentioned, are to be found in trap rock or syenite macadam, laid with our local stone; but this form of pavement is subject to very serious displacement on even moderately steep grades, by the action of water and traffic; consequently the cost of maintenance is very high, and the storm sewers are often choked up and injured. Besides, this form of pavement is dusty and cannot be satisfactorily cleaned."

Mr. Patton thinks that the disadvantages of this kind of pavement are largely, if not entirely, obviated in the use of the bitulithic pavement, which would be an ideal one for the city's avenues as well as for its streets. The Board of Public Works holds the same view on this subject as shown in its last report.

The day of wooden walks has passed, according to the city engineer, and he urges that in the future all walks be of cement which, although expensive at first, will prove much more satisfactory and economical in the end, because they eliminate the liability to personal damage suits which are proving a steady drain on the city treasury owing to the defects in the wooden walks. Where cement walks have been laid on grades as steep as 21.1 per cent. the surface was roughened by close corrugations across the walk which resembles "tooled" stone work.

PALMER'S CONCRETE BUILDING METHOD

The Origin of a New Building Material Industry—Its Successful Development—Extensively Used Throughout the United States

THERE is no line of industry in which greater progress has been made in the same relative time than in that of public building construction. By the adaption of old material for new purposes, the introduction of steel, and the advent of the concrete building block, greater advancement in the art of building construction has been made in the past twenty years than in the previous one hundred. No greater benefits have accrued from any one invention than from H. S. Palmer's method of concrete building.

Eleven years ago, Mr. Palmer, who had already made a reputation as a practical user of cement, invented a method of building construction with hollow concrete blocks. To cheapen the cost was his first aim, and when he had attained that end he found that he had produced a material which was points ahead of brick, especially as to strength.

Early in his experimental work he became satisfied that a machine would be a necessity in the commercial manufacture of these blocks, therefore he spent much time in inventing a machine which would meet all requirements, and succeeded. The machine will not only produce geometrically correct blocks and designs adapted to the use of architects, but also makes a block which requires no cutting or fitting. The experimental stage of the machine has long since passed and it is so perfect that, with its removable molds, bottom and cores, almost any desired form of solid or hollow block can be made.

The use of these hollow concrete building blocks has other advantages than those noted above; for example, the hollow flues in walls, which are produced by the regular setting of the geometrical blocks. This manner of construction affords the best ventilation, the greatest protection from atmospheric changes, besides offering better facilities for placing pipes and wires, at the same time furnishing a non-absorbent backing for plaster and decorations.

All the various inventions of Mr. Palmer have been patented. His first machine was patented in 1899 and letters patent, covering the various forms of blocks, as well as walls constructed, have been issued from time to time since the issue of his first patent. His inventive genius has, apparently, provided for every contingency which may arise in the future so that every possible need or desire of any architect, builder or owner may be satisfied.

It is an old and time honored saying that "the proof of the pudding is the eating of it," so in the test of any invention. Many inventions have proven theoretically satisfactory while they have been shown to be dismal failures when put to practical use, but there has been no failure in connection with this invention. A computation of a well known engineer, made from actual observation of the operation of one of these machines and the materials used, substantiates all claims that the blocks can be turned out at a price which makes them strong competitors of brick. In other words the machine has been put to a practical test and not found wanting.

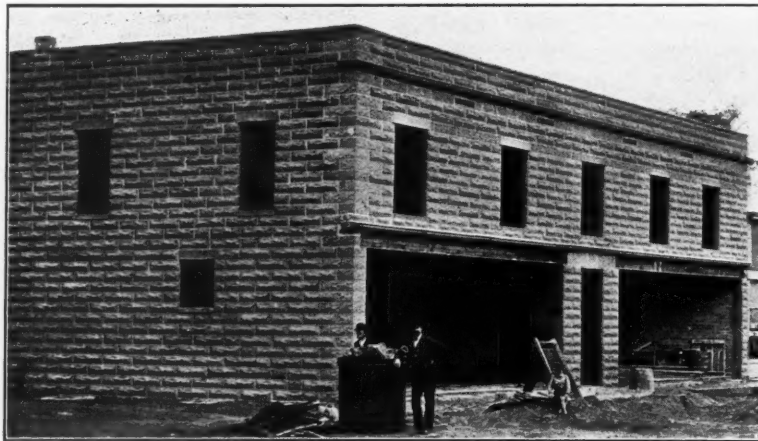
It will not be necessary to enumerate all of the qualities and advantages of this new building block, but it may be interesting to the readers of the MUNICIPAL JOURNAL AND ENGINEER to note a few of them. For example, the first is found in a saving in cost of construction, which is one of the advantages that cannot be despised in these days of expensive building materials. Another quality has to do with

the artistic appearance of buildings. The development of the æsthetic side of municipalities has become a fad in these days. These building blocks, when used in the construction of walls, not only make them frost-proof, but fire-proof as well. When it is remembered that the annual ash heap, resulting from fires in American cities, is several times greater than that of an equal number of municipalities in the old world; when it is remembered that this is due to the fact that across the water they are more particular about using fire-proof material in the construction of not only public, but private buildings, than are we, this quality of the concrete building block will be more appreciated, the reason for which, in the mind of the business man, will be the lowering of insurance rates.

There is no building material on the market which will make so warm a building in winter or cooler one in summer as the use of this concrete block, and every one will be glad to know that the use of this block will obtain greater freedom from the attack and harboring of rats and other vermin.

The tendency of the past twenty years has been to eliminate the necessity for the one time massive foundations. While foundations are thoroughly built and made as secure as engineering skill, coupled with mechanical ability, will permit, nevertheless, the change in modern building methods and the use of modern material have eliminated

in a large degree the necessity of constructing the old fashioned foundation. This concrete building block will permit another step in advance in this direction, as a less expensive foundation will be required on account of the lighter walls which may be constructed to secure equal strength with other materials. In all this there would be a saving of time and materials in construction. Whereas galvanized iron in special forms was formerly extensively used, its field may be said to be almost obliterated by the invention of this form



STORE ERECTED WITH HOLLOW CONCRETE BUILDING BLOCKS

of concrete block, as it furnishes a material which is superior in every way.

There never was a period in the building industry when little matters of economy were so closely looked after as at the present time, and for this reason the ease with which these concrete blocks are handled, and the ease of attachment of beams and joists to walls, are matters which will be fully appreciated by contractors and builders and also by the owner when he finds corresponding reduction in his bills. In this connection, it may be noted that a great saving of brick backing and of furring for plastering, the block surface taking the plaster directly, is effective. The increased facilities for inserting pipes, wires, speaking tubes, ventilators, etc., afforded by the use of these concrete blocks are items which are sure to attract the attention of the entire building industry. On the whole these blocks not only permit the construction of an exceedingly dry wall, but lower the expense in every variety of construction work, and for strength and numerous other qualities it may be said to be unsurpassed. That the many good qualities possessed by this new building block are appreciated is attested by the fact that the industry connected with its manufacture is developing very rapidly and that many buildings have already been constructed with this new material, including public buildings and residences. Several large manufacturing corporations have used these blocks for office, factory and warehouse

construction work, for all of which they have proven themselves eminently suitable in strength, durability, appearance and low cost. The Oklahoma City Stone Manufacturing Company has just completed a large four-story building for the Armour Packing Company and has ordered two carloads of machines shipped for its future work. Our illustration shows a small business block in process of construction.

This may be said to be the cement age, for the most rapid progress is being made in cement construction of all kinds. Therefore the business of manufacturing hollow concrete building blocks is sure to pay large profits. Plants for making these blocks will do a better business anywhere than a brickyard, because cement construction is in all respects equal to stone and in some ways better. While it will compete with brick in cost it will be a comparatively easy matter to demonstrate to the satisfaction of the most careful investigator that large profits can be made in this business. Plants are already in successful operation and many examples of work are to be seen. It should be borne in mind that this process in construction has no connection whatever with the cast stone process of similar name. Another point to be considered is the fact that exclusive markets and protection of patents will be guaranteed with the sale of any plant.

The blocks and the system of construction, as invented by Mr. Palmer, have been thoroughly tested under all sorts of conditions. While there have been some who were skeptical as to the merits of this new method of building construction and this new form of block a careful investigation by such skeptics has invariably been followed by a complete conviction that all that has been claimed has been shown to exist. One of the results of this invention and its rapid development has been the organization of the Harmon S. Palmer Concrete Building Block Company of Washington, D. C., whose purpose it is to extend the use of this system throughout the world. It opens a field to the man with a small amount of money at his disposal, as very little capital is required to carry on the business in any locality. No expensive building or large plant is necessary. Oftentimes the most satisfactory results are obtained by taking the machines to sources of sand or gravel, or even on the site of a building which is being constructed, thus saving one item of transportation.

This Company is prepared to answer all questions. Its literature will be mailed to any address on application.

Mr. W. W. Benson, 83 Drexel Building, Philadelphia, Pa., is general agent of the H. S. Palmer Hollow Concrete Building Block Co., and those wishing to enter this new field of industry will obtain all the information desired by corresponding with Mr. Benson.

A New Dumping Wagon

THE Shadbolt Manufacturing Company, Brooklyn, N. Y., has added another variety to its already good assortment of dumping wagons, and will soon be ready to fill orders for the same. The new wagon has been especially designed to meet every conceivable condition for city and contract work. It has been tested by a number of large contractors on the most exacting part of their work and pronounced satisfactory. This variety is designed for general use and does not take the place of the well-known Shadbolt style, which is built for special purposes. This new variety of Shadbolt wagon will be introduced on the principle of quick sales and small profits.

The Shadbolt factory was totally destroyed by fire, it will be remembered, less than two years ago, and was immediately rebuilt on a much larger scale, and although its capacity has recently been increased twenty per cent., the factory has been steadily running to the full limit. City officials, who may be planning to attend the next meeting of the League of American Municipalities at Baltimore, in October, will find it to their profit to so arrange their trip as to stop off in New York for a day or more and take time to visit the Shadbolt manufacturing plant in Brooklyn and see for themselves how a first-class wagon is constructed. Here they could also see many of the Shadbolt wagons in actual service, both in the municipal and contraction service. These wagons are used exclusively in the Brooklyn Garbage Department and elsewhere in Greater New York, on the subway and by many contractors. Every one has a good word for the Shadbolt wagon. Catalogue and price list sent on request.

Baltimore's Street Cleaning Machinery

THE city of Baltimore has a very efficient street cleaning department, made so because of its utilization of modern street cleaning machinery. Bearing in mind that Baltimore has more rough stone pavements, on a pro rata basis, than any other two cities in the country, pavements so rough and uneven that it is difficult to even clean them by hand, the work that is performed by the various machines is most satisfactory.

The sprinkling outfit is equipped with Studebaker Brothers Mfg. Co. and with the Austin-Western Co., Ltd., sprinkling wagons. The horse street cleaning machines used were made by the latter company, "the pride of New York" being the name of the particular style in use. To cover downtown streets and others which cannot be readily cleaned with the horse power machines, two kinds of hand machines are used: those made by the Menzies Street Cleaner Company, Glens Falls, New York, and others made by the Iron Clad Company. It is said that, with a Menzies Street Cleaner, a workman can keep clean about fifty per cent. more street surface than by the old fashioned method, besides paying for itself in a short time by the saving effected in its use. No shovel is required with this machine, as an automatic dirt-pan is attached, which, after it is loaded with dirt, can be emptied into the can with a single motion.

The Pennsylvania Railroad Destructor

STRANGE as it may appear paper will not always burn when fire is set to it. In fact, some kinds of paper will not burn unless special means for doing it are provided. This has been found to be the case by the Pennsylvania Railroad Company, which has a large amount of cancelled tickets and great quantities of expired bonds



and other important papers to destroy. These papers have heretofore been burned under the boilers, with the result that a good many tickets and particles of bonds passed through the chimney and blew down into the neighboring streets without being consumed.

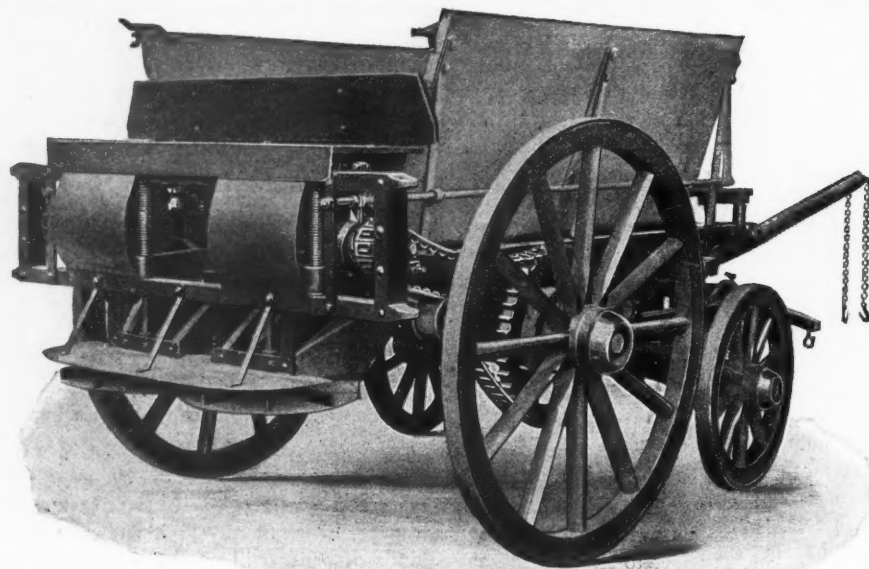
The Morse-Boulger Destructor Company has just installed, in the Annex of the Pennsylvania Broad Street Station, Philadelphia, a special furnace for the disposal of all waste of this character. It is connected with a steel chute running from the sixth floor to the top of the destructor, and the furnace is fed in this manner after the tickets, etc., have been examined and cancelled.

The destructor is provided with doors that are closed and locked during the process of incineration, preventing admission to the interior of the furnace. Thus the tickets are destroyed without any possible chance of reissuance or duplication. Twenty-three million dollars in cancelled bonds were destroyed in the destructor lately, this official bon-fire being attended by the officers of the Company.

Many large institutions, which have important cancelled papers or business stock to destroy, will find such an apparatus as this of inestimable value. It can be placed on any floor of the building, attached to any chimney, and will destroy in the shortest possible time, without nuisance or odors any waste that may be placed therein.

American Sanding Wagon

BUILT primarily for the distribution of sand on slippery pavements, this Sanding Wagon has enlarged its scope of usefulness by becoming an excellent and economical means for spreading "binding material" on macadam and other pavements, in place of the usual methods of whisking with a shovel from the tail of a cart.



The machine is also used in repairing macadam roads when it is deemed advisable to cover the surface with a layer of sand or other binding material. By comparison with the primitive methods usually employed to accomplish the work named above, this sanding wagon is a great saver of time and money, and it is commended for its economy and efficiency. Sand, ashes, or fine gravel can be thrown a width of twenty feet by this wagon, and the pavement is evenly covered within this distance.

For particulars apply to the American Road Roller Company, 156 Fifth Avenue, New York City, who are the manufacturers.

The Noble Hudson Pictured

"THE Most Charming Inland Water Trip on the American Continent," is the caption of a handsome souvenir booklet recently issued by the Hudson River Day Line. This booklet is unquestionably one of the richest and most beautifully executed publications of its kind ever produced. The heavy, rough-coated, dark green cover is embellished by half tone pictures, in colors, of Hendrik Hudson's Half Moon anchored in the Hudson nearly 300 years ago, and of one of the modern Hudson River steamers under way. The forty-two pages of super-coated paper constituting the interior of the booklet, are profusely illustrated with half-tone cuts, giving a panoramic view of the Hudson and its picturesque shores, while the descriptive matter is historically interesting and instructive. Then there are pictures of the several steamers of the Day Line and descriptions of them, and a historical sketch of the cruise of the Half Moon in 1609 from the time she entered the harbor until she again sailed away.

The book will be sent on receipt of 15 cents by F. B. Hibbard, general passenger agent, Desbrosses Street pier, New York City.

Street Signs

WHILE American cities are spending millions of dollars for street, park, sanitary and other improvements, annually, they are giving too little attention to what are sometimes considered matters of minor detail. For instance, the practice of leaving streets unmarked is too common. It is a serious inconvenience to the stranger, particularly in larger cities, as the absence of street names causes considerable difficulty in getting around. The citizens of any city are not altogether free from this annoyance. The absence of street signs in cities like New York, Chicago, Philadelphia, Boston, Baltimore, and the

larger cities, is inexcusable, for all these cities have sufficient funds at their command to mark their streets and keep a system of markings in thorough repair. But they, with the smaller cities, are negligent in this regard.

This defect arises more from negligence on the part of city officials than from lack of means. There are plenty of durable and legible signs manufactured and at a reasonable price. The Ingram-Richardson Manufacturing Co., of Beaver Falls, Pa., manufactures an enamelled iron sign which is adapted for marking the streets. This concern is said to be the largest in the country and has an enviable reputation both as to the quality and artistic class of work turned out. Some cities have awakened to the need and have ordered their street signs from this company, but every city in the United States should follow their example.

The enamelled iron sign made by the Ingram-Richardson Company is not a cheap and shoddy affair. It should not be considered in the same class with the ordinary painted sign or the etched zinc or brass sign. Sixteen or eighteen-gauge iron is used in the manufacture of this sign, to which is applied six coats of vitreous enamel, each coat being burned and amalgamated with the iron base at a heat of about fifteen hundred degrees. This process warrants the company in guaranteeing its sign for five or ten years, as the signs are not affected by change of climate.

Sometimes city officials are inclined to patronize home trade and substitute tin or wood or some home made product which is not good economy. Even when such a course is followed the signs cost as much as would be paid for a well made enamel iron sign and the

CLIFFORD ST.

advantage of the latter as compared with the home made or inferior product should be sufficient reason for purchasing the better sign. A painted sign has either to be replaced or repainted every year and so makes a fixed charge for maintenance which is almost wholly eliminated in the use of the enamel sign.

This Company guarantees its signs not to fade or tarnish. Having a glassy surface the signs cannot get dull and are as bright and attractive at the end of ten years as when first put up. Prices, estimates and samples will be furnished upon application.

Municipal Steam Turbine Plant

An interesting municipal electric lighting plant enterprise is under way at Anderson, Indiana, and marks the second introduction of the steam turbine in American municipal power plant service. The city of Anderson has for some years operated an electric light plant in connection with the city waterworks, located near White River. The electric installation is housed in a separate building approximately 50 by 100 feet, adjacent to the waterworks plant, whose boilers furnish the steam power necessary for the operation of the electric light plant.

The present lighting equipment comprises two belted generating units, but the increasing demand for light and power renders the available capacity inadequate to carry even the present load, at times resulting in a severe overloading of the entire equipment. In order to secure immediate relief from these conditions and avoid the necessity of erecting additions to the power house, Westinghouse steam turbine generating units have been selected for power extensions. At the present time two 400 kilowatt units will be installed, together with one 20 kilowatt exciter, direct connected to a Westinghouse standard engine, and a complete switchboard equipment.

As the result of the employment of turbines in this plant, it has been found possible to install a complete boiler plant in the electric light building, thus rendering the operation of the lighting system entirely independent of the waterworks system. The new boiler

plant consists of three 310 H. P. Sterling water-tube boilers equipped with Roney mechanical stokers. The boilers will not be arranged for superheat, but will supply saturated steam to the turbines at 150 pounds pressure, all condensation being returned to the boilers by a steam loop and Holly gravity return system. The turbo-generators will furnish three-phase current to the lighting power and distributing system at a frequency of 7,200 alternations and at 2,200 volts pressure, no step-down transformers being used. The turbine equipment will operate condensing, as the plant is located near the river bank, where condensing water is available. Surface condensers will be used and the condensation from the turbines will be returned directly to the boilers, as the exhaust is entirely free from oil.

An interesting feature of the turbine installation is brought out by the fact that by replacing the belted units with turbine driven units, sufficient space is made available for the installation of the complete boiler plant, together with an additional turbine unit, and the necessary boilers at such times as the future demands upon the plant require this extension.

Mr. E. R. Vincent, M. E., of Indianapolis, Indiana, has been retained by the city of Anderson as consulting engineer, and the installation is under his general supervision.

Fire Fighting Up to Date

FIRE fighting in the twentieth century has developed to an art. Everything concerned in it has been studied to reduce the size of the annual ash heap.

Fire extinguishers and engine tanks have had their share of credit, but the Diggs Fire Extinguisher Company, of New York, has practically revolutionized this branch of fire department work by placing on the market chemical engines and engine tanks with from twenty to fifty-gallon capacity, protected with their patent sealing and releasing acid receptacle, which has created a great demand for this style. Mr. Diggs, when seen at his offices, said: "Yes,



AN UP-TO-DATE FIRE FIGHTING MACHINE

it is true that we have pushed chemical engines and fire extinguishers to the front rank among fire-fighting apparatus. I have just received a large order from the New York Fire Department, which came to me unsolicited, and I consider that the greatest compliment that could be paid me." This order includes different companies, of which fourteen are hose wagons and ten hook and ladder trucks. Mr. Diggs spoke very enthusiastically of his plans, which are on a large scale, including many improvements to the factory.

The export trade has become a big factor in this business, and the recent exhibit of this Company at the International Exhibition of fire apparatus at Earls Court, London, is said to have been one of the most interesting there.

Eight different sizes and types of hand extinguishers are made at the factory, all being of the regular standard. Besides a line of copper tanks from a one and one-half-gallon automobile and yacht extinguisher to a 250-gallon tank for stationary systems, there are three types of wheeled or handled engines for factory or village use. Any further information can be had by addressing the Diggs Fire Extinguisher Company, 141-3 Centre Street, New York City.

Notes of Interest About the Trade

—THE Interborough Railroad Company has contracted for an escalator to be installed at the Thirty-third Street station of the Sixth Avenue Elevated Road. The escalator will be placed on Broadway just north of Thirty-third Street, and will carry passengers direct to the downtown station. A foot-bridge will extend over the tracks to the uptown station, and it is anticipated that a majority of the north-bound passengers will avail themselves of the escalator and foot-bridge, thus avoiding the laborious climb of the stairway used at present. In connection with this installation, the commendable action of the owners of the department store on this corner in surrendering much of their sidewalk and part of their basement space should be noted.

—The Pneumatic Engineering Company, of New York City, has just issued an attractive, illustrated booklet of forty-eight pages, with a handsome cover, which tells all about pumping by compressed air. A copy of the booklet and prices can be secured by addressing the Company at 128 Broadway, New York.

—The Otis Elevator Company has just issued a 64-page catalogue, telling all about the Otis elevator industry, which comprises large manufacturing plants in the principal cities in the United States, Canada, Great Britain, Germany and France. The Otis Elevator Company, New York, will be pleased to send a copy of this booklet to any address, and is always glad to furnish estimates for work to be performed in the elevator line.

—The collection and disposal of garbage is one of the important civic questions of the day. There are certain classes of city refuse which are fit only for incinerating and every city of 20,000 population or over should be equipped with a garbage destructor of sufficient capacity to handle this class of refuse matter. The Decarie Manufacturing Company, of Minneapolis, Minn., has just issued a valuable catalogue which is thoroughly illustrated, showing up the Decarie destructor. It also contains a lot of valuable information.

—The Morse-Boulger Destructor Company, 39 Cortlandt Street, New York, has been awarded the contract to construct for the Buffalo Sanitary Company a refuse utilizing station, located on what is known as the Hamburg Canal strip. The station will be similar to the one in Boston, and the heat generated from the destruction of the refuse will generate 125 horse power of steam for use in an adjoining sewage disposal plant. It is estimated that this destructor plant will save \$10,000 a year for the city. The Morse-Boulger Company has just issued a handsome 48-page booklet, descriptive of its work here and abroad.

—Messrs. E. P. Roberts & Company, of Cleveland, O., consulting engineers, have opened a department of cement engineering and are now prepared to take entire charge of the designing and supervision of the construction and operation of cement plants. This firm has been in business for ten years and has large experience in electrical, mechanical and civil engineering, having had the consulting and supervising work for a great number of electric railways, electric lighting and power plants, manufacturing plants, etc. The cement department opens up a new field and the services of Mr. George S. Perkins, M. E., have been secured to look after the work. Mr. Perkins is a graduate of Stevens Institute of Technology, class of 1891, in the course of mechanical engineering, and has had an extensive experience in the designing and constructing of cement plants.

—The firm of H. Huennekes & Co., 114 Liberty Street, has been incorporated under the laws of the State of New York, with a capital stock of \$500,000. The corporate name is, The H. Huennekes Company, contractors and engineers for sand lime building bricks.

—Well on toward a score of large and important contracts, for filtration plants, have recently been awarded to William B. Scaife & Sons Co., Pittsburg, Pa., among which are included the following: Rahway, N. J., municipal plant, gravity type, with capacity of 3,000,000 gallons per day; Consolidated Water Power and Paper Co., Grand Rapids, Wis., plant of 2,000,000 gallons per day capacity of the gravity type; D. A. Tompkins Co., Charlotte, N. C., gravity type, 500,000 gallons per day capacity; Bessemer Building, Pittsburg, Pa., 175,000 gallons per day, pressure type; Phipp's Public Bath House, Pittsburg, Pa., 175,000 gallons per day, pressure type; and the Duquesne Club, Pittsburg, Pa., 125,000 gallons per day, pressure type.

CONTRACT NEWS FOR THE MONTH

Including Paving, Sewerage, Water Supply, Lighting, Public Buildings, Sewage and Garbage Disposal, Fire Supplies, Contracts Awarded

N. B.—All news of proposed work sent us by city officials is incorporated in our *Weekly Advance News Service* and appears subsequently in this "Contract News for the Month" if the date of the reception of bids be sufficiently late to warrant placing the item here.

City officials and others are urged to send us all news of contemplated improvements for use in our *Weekly Bulletins* which are mailed to those interested.

PAVING, PAVING MACHINERY AND MATERIAL

Ada, O.—Plans for paving on Main and Buckeye streets are being made by O. P. Wilson, Kenton, O.

Alexandria, La.—Bids are wanted Sept. 14th for \$28,000 worth of paving bonds.

Amite, La.—Bids are wanted Sept. 7th for two hundred miles road. S. B. Cooper, President, Police Jury.

Beloit, Wis.—Planning macadam and brick paving. City Engineer Caldwell.

Bridgeport, Conn.—The Council is discussing the question of brick paving again.

Champaign, Ill.—The paving of Prospect avenue has been under consideration.

Chandler, Okla. Ter.—The city has voted \$50,000 in bonds for water works and street improvements. W. Burgess, Mayor.

Clark, Ga.—The county will vote Sept. 3rd on an issue of \$100,000 worth of bonds for macadamizing the public roads. County Clerk.

Des Moines, Ia.—Asphalt will be laid on Centre street—about ten miles. Mayor Brenton.

Evanston, Ill.—\$750,000 will be spent on 25 miles of paving.

Freeport, Ill.—Brick will doubtless be laid on Chicago and Williams street. City Engineer Graham.

Gibson City, Ill.—\$30,000 will be spent on paving with brick and stone. City Clerk Stouffer.

Greenville, Miss.—A contract for 30,000 square yards of brick paving will be let about the 15th of September. City Engineer Allen.

Helena, Ark.—Paving district No. 1 has been formed for the purpose of paving Main street in Helena with vitrified brick at \$50,000. No contract has yet been awarded. C. H. Purvis, Engineer in charge.

Husted, Colo.—A road will be built to Edgerton, a distance of three miles. County Commissioners.

Independence, Kan.—Bids are wanted Sept. 1st for paving on several streets. City Clerk Alice V. Ray.

Lake Charles, Ia.—Bids are wanted Sept. 1st for 19,500 square yards of brick or asphalt. City Engineer Bowen.

Marion, Ind.—About seven miles of brick paving will be laid. City Engineer Petrie.

Milwaukee, Wis.—Several streets in the 18th Ward will be paved with asphalt.

New Brunswick, N. J.—Bids are wanted Sept. 2nd for stone and gravel roads. Dir. Fountain. Board Chosen Freeholders.

New Orleans, La.—\$50,000 has been appropriated for repairing the asphalt streets.

New York, N. Y.—The July Grand Jury recommended the establishment of a municipal asphalt repair plant.

Norfolk, Va.—The American Cement Co. of Philadelphia, Pa., has organized the Seaboard Cement Co. and will establish plants.

Paducah, Ky.—The city will vote on an issue of \$100,000 in bonds for building new streets. The Mayor.

Rensselaer, Ind.—Bids are wanted Sept. 7th for gravel road in Hanging Grove township. Co. Auditor Babcock.

St. Bernard, La.—\$50,000 in bonds has been voted for improvements. County Clerk.

Salisbury, N. C.—The city has voted to issue \$90,000 in bonds for street improvements. The Mayor.

San Diego, Cal.—The asphaltting of 5th street is to be planned. City Clerk Goldman.

San Francisco, Cal.—The Board of Public Works reports plans for repairing and improving the streets at a cost of \$1,621,000. A vote is to be taken Sept. 29th.

Schenectady, N. Y.—Two miles of paving is under consideration.

Seabright, N. J.—\$60,000 will be spent for building a stone road. County Engineer De Nyse, Long Branch.

Southampton, N. Y.—Reports state that a vote will be taken in September on a bond issue of \$250,000 for macadamizing the road to Sag Harbor—38 miles.

Superior, Wis.—The aldermen want to buy a rock crusher.

Taylorville, Ill.—\$100,000 will be spent for paving streets.

Williamsport, Pa.—40,000 square yards of paving will be laid next year. City Engineer Fisher.

CONTRACTS AWARDED

Ashland, Wis.—Contract has been let T. J. McGrath, Green Bay, for macadamizing Ellis avenue at \$20,000.

Boston, Mass.—Contract has been let D. J. Kiley, for granite block on concrete on Beverly street, at \$10,058.

Bowling Green, O.—George Mercer has received the contract for 16 miles stone roads at \$60,000.

Buffalo, N. Y.—Charles A. Gorman, Medina, N. Y., has received the contract for Medina sandstone block at \$15.50 per cord.

Champaign, Ill.—John W. Stipes has been awarded the contract for brick paving on Washington street, at \$1.33 per square yard.

Cooperstown, N. Y.—The contracts for roads have been let Jos. Walker, Mariner's Harbor.

Davenport, Ia.—The McCarthy Stone Company has been awarded the contract for 5,642 square yards of brick at \$9,024.

Delphi, Ind.—The contract for 26 miles gravel and macadam road has been let James M. Pierce at \$64,439.

Denver, Colo.—Hugh Murphy has been awarded the contract for walks on E. Capitol Hill at \$15,432.

E. Liverpool, O.—Rosser & Malone, Bellaire, have received the contract for improving St. Clair road at \$21,000.

Fowler, Ind.—The contract for two miles of Reuben Michael road has been let W. E. Pickens.

Freeport, Ill.—The contract for macadamizing Douglas avenue at a cost of \$20,500 will be let soon according to reports. City Engr. Graham.

Grand Rapids, Mich.—The contract for paving State street with Kentucky rock asphalt has been let the Interstate Construction Co. of Fort Wayne at \$13,973.

Highland Park, Ill.—The contract for macadamizing two miles of street has been let James Cape & Sons at \$30,000.

Indianapolis, Ind.—The contract for wood paving on Ashland avenue has been let the Hoosier Construction Company at \$5.52 per lin. foot.

La Porte, Ind.—The contract for seven miles of macadam road has been let Wm. B. Hutchinson, Michigan City, at \$35,675.

Lisbon, O.—The contract for paving Calcutta road has been let Rosser & Malone, Bellaire, at \$21,000.

Lorain, O.—The contract for Metropolitan block on Third avenue, Bank and Prospect streets has been let the Ohio Engineering Co.

Louisville, Ky.—A contract has been let the American Standard Asphalt Co. for paving Rosewood avenue and First street.

Marion, O.—The contract for Salem pike has been let Rummer & Carroll at \$16,970.

Marshall, Mich.—The contract for paving State street has been let George H. Kneal, Lansing, at \$34,000.

Montgomery, Ala.—Hannon & Hodgson has received the contract for walks on two streets at a cost of \$24,475.

Morgantown, W. Va.—F. E. Dean has received the contract for paving Third street at \$8,000.

Napa, Cal.—George Errington has been awarded the contract for macadam on Coombs street at \$1.05 per lin. foot.

Newark, N. J.—The contract for paving Sylvan avenue has been let the Newark Paving Co. The contract for granite paving on Madison street has been let the J. Roosevelt Shanley Co. at \$14,283.

Newcastle, Ind.—Sam Dingle has received the contract for brick on three streets at \$22,000.

Newton, Ia.—The contract for paving Main street with brick has been let the McCarthy Stone Co., Davenport, at \$1.78½ per square foot.

New York, N. Y.—The contract for the second part of Riverside Drive has been let Ryan & Parker at \$1,500,000.

Niagara Falls, N. Y.—The contract for 6,500 square yards brick paving has been let the Forest City Paving Co.

Norwalk, O.—The Bellaire Stone Co. has received the contract for two miles of road.

Ottawa, Ill.—Thompson & Case, Peoria, have received the contract for paving Lincoln and University avenues at \$14,141.

Ottumwa, Ia.—The contract for brick on sand has been awarded Magden & Sheely, Des Moines, at \$1.74 per square yard.

Pine Bluff, Ark.—The contract for paving W. 6th street has been let to Zeb Ward, of Little Rock, Ark., at \$15,000. The contract for paving one mile of street has been awarded the Mississippi Valley Construction Co. of Little Rock, at \$50,000.

Port Huron, Mich.—William J. Clancy, Ann Arbor, has received the contract for two miles of paving.

Princeton, Ind.—The contract for fifty-nine miles of macadam road let C. P. White, Boon, at \$122,024.

St. Johns, Mich.—Lloyd & McKay, Detroit, have been awarded the contract for block paving on Clinton avenue and Walker street, at \$1.71 for Lane, \$1.72 for Athens, and \$1.74 for Malvern block per square yard.

St. Joseph, Mo.—E. M. Helsey & Co. have received the contract for macadamizing Charles street.

Seattle, Wash.—The contract for paving First Avenue South has been let F. McClellan & Co. at \$60,600. Contract let S. Normile for paving E. Cherry street.

Sevierville, Tenn.—Robert L. Peters, Knoxville, has been awarded the contract for rebuilding Sevierville Pike at \$16,000.

Sharon, Pa.—Cochran & Parody, of Mahoningtown, have received the contract for paving several streets.

Stillwater, Minn.—The contract for sandstone pavement has been let Fielding & Shepley, St. Paul, for sandstone paving at \$2.74.

Swissvale, Pa.—The contract for paving four streets has been let Thomas Sweeney & Co., Pittsburg. Boro. Engr. Judd.

Syracuse, N. Y.—The Central City Paving Co. bid the lowest for paving Canal street.

Tolland, Conn.—The contract for grading and graveling over a mile of road has been let A. C. Sterling, W. Hartford.

Tyrone, Pa.—The contract for paving Lincoln avenue has been let the Central Constr. & Supply Co., Harrisburg. Boro. Engr. Henry.

Vernon, Ind.—The contract for three miles of road has been let Hudson & Kendrick, Hayden, at \$7,300.

Versailles, Ind.—Contracts for macadam roads have been let Nicholas Cornet, Versailles, and Deputy Bros. & Wagoner, Paris—11 miles each.

Waterbury, Conn.—The contract to pave N. Main street has been let Chatfield & Chatfield.

Webster Groves, Mo.—The contract for paving Maple and three other streets has been let James G. Mackenzies, St. Louis.

W. Derry, N. H.—W. Broadway will be macadamized by the D. B. Pierce, Jr., Co.

Wheeling, W. Va.—The contract for street paving has been let George W. Lemmon.

Wilkes-Barre, Pa.—The contract for Mack brick on concrete on Gildersleeve street has been let Frank Kuss at \$2.65 per square yard.

Wilmington, Del.—Simmons & Wells have been awarded the contract for Belgian block paving at 12 cents per square yard. The Christiania Constr. Co. has received the contract for macadamizing Hares Corner road.

LIGHTING AND TELEPHONE

Alexandria, La.—An independent telephone line to Monroe will be built. Alpena, Mich.—Will vote Sept. 14th on issuing \$100,000 in bonds for a city electric light plant.

Athens, O.—Bonds for an electric light plant have been voted.

Bad Axe, Mich.—\$15,000 will be spent in improving the electric light plant and water works.

Berlin, Pa.—This borough may buy and operate the electric plant of the Berlin Electric Light Company.

Big Springs, Tex.—The Western Telephone Company has been incorporated, with a capital of \$15,000, by A. L. Alderman and others.

Boonsboro, Md.—An electric light plant is under consideration. The Mayor.

Boydton, Va.—The Mecklenburg Telephone Co. has been incorporated at \$5,000. W. H. Elam, Jr., is one of the interested parties.

Burlington, Ia.—This city is considering an ordinance to place all wires underground.

Burlington, N. C.—\$18,000 in bonds have been voted for an electric light plant. The Mayor.

Burlington, Vt.—Plans for an electric light plant to cost \$150,000 are being considered by a committee. Mayor Burke.

Clarion, Ia.—It was recently voted to improve the electric light plant.

Cienfuegos, Cuba.—Bids are wanted Sept. 28th for an electric light system and service; 150 arcs and 350 incandescents. City Clerk R. P. Morales.

Colton, Cal.—A franchise for a gas plant has been let George B. Ellis & H. W. Allen, Redlands Gas Co.

Dadeville, Ala.—An electric light plant is contemplated here. City Clerk Lovelace.

Danville, Ky.—An electric light plant to cost \$30,000 will be put in here. The Mayor.

Dell Rapids, S. D.—Electric lights for this place are under consideration.

Durant, Ind. Ter.—It was voted to issue \$85,000 in bonds for an electric light plant, water works and sewers. Town Recorder Shannon.

Edenton, N. C.—Water works and electric light plant will be built here. Sam Menchal has been selected as the engineer.

Edwardsville, Ill.—The Edwardsville Electric Light and Power Co. has a seven-year franchise and will light the city.

Farmville, Va.—The Southside Telephone Co. has been incorporated. J. D. Egleston, Jr., Worsham, Va., is interested.

Genesee, Idaho.—A franchise for an electric light plant has been let T. A. Pieplow.

Hanford, Cal.—A franchise for an electric light plant has been let C. E. Baker.

Hartwell, Ga.—Bonds for an electric light plant have been voted.

Hartford, N. C.—An electric plant may be installed at this place.

Hillsboro, Wis.—A franchise for an electric light plant has been let Myron Goodsell.

Hubbard, O.—\$10,000 in bonds will be issued for an electric light plant. Village Clerk Schreiber.

Independence, Mo.—The Home Telephone Co. is being organized by S. H. Woodson and others.

Independence, Ky.—The Northern Kentucky Telephone Co. has been incorporated with a capital of \$100,000. Frank L. Ludlow, Covington, is interested.

Lakeland, Fla.—Bids are wanted Sept. 12th for \$35,000 electric light and water works bonds.

Laurinburg, N. C.—The construction of an electric light plant to cost \$10,000 is being considered.

Lawrenceburg, Ky.—The city will construct a system of water works and install an electric light plant. T. J. Ballard, Member of Committee.

Lincoln, Neb.—The Cleveland Vapor Lighting Co. installed vapor gas lights in place of electricity.

Los Angeles, Cal.—The Home Telephone Co. has been incorporated with a capital of \$100,000.

Mayfield, Ky.—The city may purchase the Garvis Co. water and light plant. Should the purchase not be made the city will consider constructing plants. City Clerk McNally.

N. Yakima, Wash.—A franchise for a gas plant has been let Charles B. Hurley, Tacoma.

Norwood, Minn.—\$4,000 in bonds have been voted for a gas plant.

Pierce, Neb.—Electric lights for this place are talked of.

Picton, N. S.—A vote will be taken on a municipal plant.

Pine Bluff, N. C.—A company is being formed for the erection of electric light plant to light the city. Board of Trade.

Portland, Ore.—The Portland General Electric Co. bid \$54,000 per year for 850 lamps. City Auditor Devlin.

Port Washington, Wis.—Water works and an electric light plant are recommended by the Water Works Commission.

Quincy, Ill.—The city will issue \$30,000 in bonds for the erection of an electric light plant and constructing a system of water works. The Mayor.

Ridgeway, O.—An electric light plant may be installed here. Village Clerk.

River Rouge, Mich.—\$28,000 in bonds has been voted for an electric light plant.

Rome, Ga.—A municipal light plant is contemplated.

Sag Harbor, N. Y.—The village may buy or build an electric light plant.

St. Joseph, Mo.—This city is considering building an electric light plant to cost \$100,000. A vote is to be taken on an issue of \$320,000 in bonds for remodeling the electric plant and for sewers.

Santa Ana, Cal.—A vote is to be taken on issuing \$60,000 in bonds for an electric light plant.

Schenectady, N. Y.—May put in an electric power plant and water works.

Seaford, Del.—It was reported that \$10,000 of electric light bonds would be sold Aug. 20th.

Sheboygan, Wis.—The Council is considering plans for electric light and water plant.

Stockton, Cal.—Bids are wanted Sept. 14th for \$160,000 electric light plant bonds. City Clerk George S. Wheatley.

Spencerville, O.—Enlargement of the electric light plant is contemplated. Village Clerk.

Stockbridge, Mass.—The town is considering an electric light plant.

Tawas City, Mich.—May spend \$20,000 on extending the electric light and water works.

Troy, N. C.—The Troy Telephone Co. has been incorporated with a capital of \$100,000 by O. M. Wade.

Vidalia, La.—This place is considering an electric light plant and water works. Mayor Campbell.

Vinalhaven, Me.—The Vinalhaven Lighting Company will put in an acetylene gas plant. F. S. Wells, President.

Walnut Grove, Miss.—The Mutual Telephone Co. has been incorporated with a capital of \$100,000.

Wethersfield, Ill.—May install an electric light plant for the village. Pres. C. A. Brown, Kewanee.

Wabash, Ind.—Will possibly put in \$40,000 electric light plant.

Wakefield, Mich.—A vote will be taken on issuing \$10,000 in bonds for an electric light plant.

Western Grove, Ark.—The Western Grove Telephone Co. has been incorporated with a capital of \$25,000 by H. R. Magness.

Weston, Ore.—An electric power station is being planned. County Surveyor Kimbrell.

Whitley, Ont.—Cnty water works and electric lighting have been voted. Town Clerk White.

Winder, Ga.—Plans for a municipal electric light plant are being made by Collier & Brown, Atlanta, Ga.

Winnetka, Ill.—A \$75,000 gas plant will be erected. City Clerk Henling.

CONTRACTS AWARDED

Clayton, Ala.—The contract for water works and electric light plant has been let T. D. Grubbs & Co., at \$24,989.

Dawson, Ga.—The contract for enclosed arcs for the city has been let the General Electric Company, Atlanta.

Ft. Riley, Kan.—Contract let Junction City Electric Ry., Light and Ice Co. for lighting. The plant will be enlarged.

Ft. Snelling, Minn.—Contract for an electric light plant has been let C. F. McBride, St. Paul, at \$19,276.

Harrisburg, Pa.—The contract for an electric equipment in the State Capitol has been let Keller, Pike & Co., Philadelphia.

Huntsville, Ala.—The contract for an arc light system has been let the General Electric Company.

Independence, Wis.—The contract for an electric light plant has been let Crowley Electric Co., Duluth, Minn., at \$3,050. Vil. Clk. Jackson.

Madison, Me.—The contract for a \$40,000 electric plant on Sandy river has been let Hall & Reed, Skowhegan.

Noblesville, Ind.—The Noblesville Hydraulic Co. has the contract for street lighting and will build a dam for power purposes.

Salem, Ore.—The contract for lighting school, capitol, etc., has been let the Citizens Light and Traction Company.

Springfield, Ill.—The contract for state power plant on E. Monroe street has been let the Culver Constr. Co. at \$60,000.

Wabash, Ind.—The contract for street lighting for ten years has been let the Wabash Electric Light Co. at \$70 for arc and \$17.50 for incandescent. Improvements to be made.

Winnsboro, N. C.—The contract for electric light plant has been let S. B. Alexander Jr. Co.

Proposal by the City of Waco, Texas, for Bids for Electric Light Contract

THE City of Waco, Texas, will receive bids at the office of the City Secretary for a contract for electric lighting for the respective periods of five, ten and fifteen years; said bids to be made upon, and the contract to include the following items:

1st. For public arc lights of number not less than 150, open lamp of 9.6 amperes per lamp; enclosed lamp of 6.6 amperes per lamp; all lights to be located as City Council may direct.

2nd. Terms to private consumers for all commercial and domestic lighting.

3rd. Terms to private consumers for electric power for all purposes.

The bids will close at noon on the first day of October, 1903. The City reserves the right to reject any and all bids.

ALLAN D. SANFORD, Mayor.

SEWERS

Akron, O.—Plans for the Power street sewer are to be made by the City Engineer.

Annapolis, Md.—An extension of the sewerage system is being considered.

Austin, Tex.—Plans for storm sewers are ready.

Boston, Mass.—\$600,000 will be spent on intercepting sewers.

Camden, N. J.—Sewers will be built in four streets. St. Com. Mohrman.

Caro, Mich.—A sewer system for this place is being considered.

Centralia, Ill.—The Iowa Engineering Co., engineers in charge, inform us that the contract for ten miles of sewers will be let Sept. 1st. The Weston Block, Clinton, Ia.

Cincinnati, O.—Sewers for Harriet street and Colerain avenue are proposed. Martin and three other streets are to be sewer. City Engineer.

Claremont, N. H.—Surveys for the sewer system are ready.

Decatur, Ga.—A sewer system will probably be built here.

Demopolis, Tenn.—\$25,000 in sewer bonds will be issued.

Easthampton, Mass.—\$9,750 will be spent for sewer work. Sewer Com. Sawyer.

Indiana, Pa.—Plans for sewers have been adopted.

Kansas City, Mo.—It will cost \$25,000 to improve the Henning street sewer.

Lakewood, O.—\$29,000 in bonds will be issued for sewer purposes. Village Clerk Sensel.

Leominster, Mass.—A new sewer system is to be built.

Lincoln Ill.—A petition asks for sewers. Bids are wanted Sept. 1st for 2,140 feet 12 to 18-inch sewers. City Clerk Berry.

Lowell, Mass.—Will sewer Clitherne, New Moody, Crawford streets and 6th avenue.

Marion, Ind.—Bids are wanted Sept. 4th for a sanitary sewer. City Clerk Robbins.

Marlboro, Mass.—Plans for an auxiliary sewer are ready.

Massillon, O.—Sewers in E. Tremont and Ft. Main streets are contemplated.

Moscow, Idaho.—Plans for \$100,000 sewer system have been prepared.

New York, N. Y.—Will build \$120,000 sewer system in Woodlawn Heights.

Oswego, N. Y.—Five sewers are to be built.

Owasso, Mich.—A sewer in King street is contemplated.

Paducah, Ky.—An extension of the sewer system is contemplated.

Peoria, Ill.—Will estimate the cost of N. Peoria sewer.

Portland, Ore.—Will sewer 9th, E. 37th and two other streets.

Reading, Pa.—An extension of the sewer system is contemplated.

Rushville, Ill.—An estimate of the cost of a sewer system will be made.

Sacramento, Cal.—A sewer system for this place is contemplated.

San Francisco, Cal.—Will vote, Sept. 29th, on a sewer system to cost \$7,000,000.

Skaneateles, N. Y.—Has voted \$20,000 for a new sewer. Village Board.

Springfield, Mass.—Plans for the trunk sewer extension—5,800 feet—are ready. City Engineer Batterson.

Springfield, O.—A sewer for Lagonda avenue is being discussed.

Tacoma, Wash.—Sanitary sewers are to be laid. City Clerk Woodruff.

Trenton, N. J.—An ordinance has been passed to lay sewers in E. State street and two others. City Clerk Murray.

W. Allis, Wis.—\$50,000 in bonds are to be issued for sewer purposes.

Woodstown, N. J.—A sewer system here is being considered.

Brazil, Ind.—Will lay sanitary sewers.

Campton, Ky.—Will install a sewer system.

(Continued on page 29.)

The Best Books on Municipal Subjects

- AMERICAN MUNICIPAL PROGRESS. Chapters in municipal sociology. Charles Zueblin. 380 pp. \$1.25 net. mc.
- THE PUBLIC SCHOOL SYSTEM OF THE UNITED STATES. Dr. J. M. Rice. 307 pp. 1.50. c.
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- FINANCES OF GAS AND ELECTRICITY MANUFACTURING ENTERPRISES. How to run plans successfully. William D. Marks. 120 pp. \$1.00.
- ELECTRIC LIGHT PLANTS. Their cost and operation. Buckley. \$1. ftw.
- MONOPOLIES PAST AND PRESENT. A study of monopolies and the problems connected with those of the present. James E. Le Rossignol, Ph.D. 253 pp. \$1.25. tc.
- WATER SUPPLIES. John C. Thresh. (English.) 497 pp., illus. \$2.00. b.
- DISINFECTION AND DISINFECTANTS. A practical guide for sanitarians, health and quarantine officers in stamping out infection. M. J. Rosenau, M.D. 345 pp., illus. \$2.00 net. b.
- MUNICIPAL PUBLIC WORKS. Their inception, construction and management. S. Whinery, C.E. 341 pp. \$1.50. Postage, 13 cts. mc.
- WATER AND WATER-SUPPLIES. A general work including purification, distribution, etc., of water-supplies. John C. Thresh. (English.) 500 p., illus. \$2.00 net. b.
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- MODERN TREATMENT OF SEWAGE. Principles for design of sewers and purification of sewage. (English.) H. C. H. Shenton. 117 pp. \$1.00.
- ENGINEERING FOR LAND DRAINAGE. Manual for laying out and constructing drains. Charles G. Elliott. 222 pp., illus. \$1.50. w.
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- FACTS ON FIRE PREVENTION. The result of tests by British Fire Prevention Committee. Edwin O. Sachs. (English.) 2 vols., 226 pp. each. Illus. \$10. sr.
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- WATER AND PUBLIC HEALTH. The relative purity of waters from different sources. James H. Fuertes. \$1.50. w.

SEE ALSO OTHER LISTS IN THESE PAGES

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253 BROADWAY NEW YORK

Clinton, Ia.—Plans for sewers are being made by City Engineer Chase.
 Columbus O.—A sewage pumping station will be installed.
 Danville, N. Y.—Sewerage to be installed. Knight & Hopkins, Rome.
 E. St. Louis, Ill.—May build a number of ten foot sewers to the river.
 Eaton Rapids, Mich.—Plans for a sewer system have been completed.
 Frederick, Md.—Franchise for a sewer system has been asked by Thomas H. Haller.
 Fulton, N. Y.—A sewer system on the west side will soon be installed.
 Galesburg, Ill.—A complete sewer system may be built. City Engineer Connolly.
 Harrisburg, Pa.—Sewers have been recommended by City Engineer Cowder.
 Henderson, N. C.—Sewers will be planned by J. E. Ludlow, Winston.
 Hutchinson, Kan.—Sewers for this place are being considered.
 Knoxville, Ia.—A sewer system may be installed.
 Leroy, Ill.—A sewer system to cost \$25,000, may be installed. Mayor Vanata.
 Norfolk, Neb.—A sewer system for this place is talked of.
 Rochester, N. Y.—Lovenzis street must be sewer.
 Rushville, Ind.—Plans for a sewer system to cost \$60,000 are ready. City Engineer Stewart.
 Salem, Mass.—Plans for a sewer system here are ready.
 Swampscott, Mass.—\$35,000 will be spent on sewers. Sewer Com. Bunting.
 Terre Haute, Ind.—Plans for pipe sewer for No. 6th street to be made. City Engineer.
 Vinita, Ind. Ter.—Plans for sewers and water works are to be made by Burns & McDonnell, Kansas City, Mo.
 Wadsworth, O.—Surveys for sewers are being made by Paul Bros. of Akron.
 Westfield, N. Y.—Sewers for this village are being considered.
 Vancouver, B. C.—Will raise \$350,000 for sewers. City Engr. Tracy.
 Xenia, O.—Sewer system should be completed, according to the Board of Public Service.

CONTRACTS AWARDED

Albany, N. Y.—Contract for the Bertha street sewer has been awarded John Doyle.
 Alexandria Bay, N. Y.—The lowest bid for sewers and water works was made by Thomas Marnell, at \$68,000.
 Grand Rapids, Mich.—Contract has been let for sewer in Dayton and White streets to W. D. Humbling, at \$2,040, and Pine and B streets to Van Ess & Hoerschop at \$6,900. Bids are wanted for sewer in Indiana street. City Engr.
 Hazleton, Pa.—The contract has been let Ario Ruth for the Chestnut street sewer at \$2,570.
 Indiana, Pa.—The contract has been let John Hermann, Latrobe, Pa., for a sewer system, at \$22,960.
 Lansing, Mich.—Contract let Black & Harton for sewers at \$26,360.
 Newark, N. J.—Contract for sewer on Huntingdon and Washington streets let Hedley & Christie at \$12,250.
 New Haven, Conn.—Contract let T. E. Mabce for a sewer in Harriet street at \$1,264.
 Newark, N. J.—Contract for lateral sewers let James P. Hall & Son.
 Oakland, Cal.—Contract let for laying and furnishing 8-inch vitrified iron stone pipe for sewer in Thirty-ninth street to Michael Murphy at 68 cents per lineal foot, and sewer in Howard street at 90 cents per lineal foot to E. Cavanaugh.
 Pasadena, Cal.—A contract has been let S. J. Edwards for a sewer in Waverly Drive. City Engineer Allin.
 Sandusky, O.—Contract for sewers in four streets has been let Frank Henry & Sons.
 Stroudsburg, Pa.—Lowest bid for a sewer system has been made by Shoemaker & Grossart, Allentown.
 So. Nyack, N. Y.—A contract has been let Pat. T. Plunkett, 348 Webster avenue, Jersey City, for the Washington avenue sewer.
 Tonawanda, N. Y.—A contract for a sewer pipe has been let G. F. Myers, Foundry street, at 27 cents per foot for 10-inch; 36 cents for 12-inch; 48 cents for 15-inch. Gillie Engine Machine Co. received the contract for manhole tops at \$8.65; catch basin tops at \$17.49, and traps at \$1.55.
 Waukegan, Ill.—Supt. Public Works R. J. Smith, writes that contract for sewers in district 2 was let Charles T. Bartlett, Evanston, at \$24,205.85, at from 30 cents to \$2.50 per foot for 6 to 18-inch sewers; manholes, \$28; flush tanks, \$38.
 Wheeling, W. Va.—Contract for sewer work has been awarded Martin Flanagan.

PUBLIC BUILDINGS

Bedford, Ind.—\$75,000 will be spent here for a federal building.
 Boston, Mass.—A new school will be erected at a cost of \$180,000.
 Camden, N. J.—\$80,000 is wanted for school houses by the authorities.
 Chattanooga, Tenn.—A Carnegie library is to be built here.
 Cheswick, Pa.—A new school house to cost \$35,000 will be built.
 Chillicothe, O.—A \$75,000 post office is being planned for this place. J. K. Taylor, Treasury Dept., Washington, D. C.
 Claremont, N. H.—A Carnegie library will soon be built here. H. M. Franchis & Sons, Archs., Fitchburg, Mass.
 Como, La.—A court house to cost \$22,000 is being planned for the Franklin parish.
 De Kalb, Ill.—Planning \$100,000 court house.

(Continued on page 30.)

The Best Books on Municipal Subjects

TREATISE ON HYDRAULIC AND WATER-SUPPLY ENGINEERING. Practical construction of waterworks in America. J. T. Fanning. Illus., 650 pp. \$5.00. v.
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 MUNICIPAL YEAR BOOK. M. N. Baker. 350 pp. \$3.00. e.
 COST OF LAYING WATER PIPE. C. D. Barstow.
 AMERICANS IN PROGRESS. A story of settlement work in Boston. Robert A. Woods. 383 pp. \$1.50 net. h.

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Municipal Journal Publishing Co.
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Dickinson, Va.—The county will build a brick jail to cost about \$10,000.
 Easley, S. C.—A new school will be built here. The Mayor.
 Houston, Tex.—Will build a fire hall to cost about \$30,000.
 Hutchinson, Kan.—A government building is to be erected here at a cost of \$50,000.
 Huntington, Ind.—A new court house to cost \$200,000 will be erected at this place. Board County Commissioners.
 Johnstown, Pa.—A new court house to cost \$300,000 is talked of. Judge Kooser.
 Kalispell, Mont.—Plans for a city hall are being prepared.
 Keyser, W. Va.—The city will issue \$15,000 in bonds for the erection of a new school. The Mayor.
 Lake Nebagomaw, Wis.—May vote on bonds for a town hall. Town Clerk.
 Marion, Ind.—Will choose site for a federal building.
 Muncie, Ind.—A city building is talked of here.
 New York, N. Y.—Plans for an \$80,000 jail and court house for Richmond are now ready. Bids are wanted Sept. 1st for an armory for the 2nd Bat. Naval Militia in Brooklyn. Armory Board, 280 Broadway.
 Pasadena, Cal.—\$50,000 in bonds have been issued for school purposes.
 Portland, Me.—A new site has been suggested for the proposed county court house.
 Quincy, Fla.—A new jail for Gadsden County may be erected.
 Rensselaer, N. Y.—A new city hall is contemplated. Mayor Lansing.
 Salem, Mass.—Remodeling of the city hall will be planned. H. K. Wheeler, Arch.
 San Francisco, Cal.—The Board of Public Works reports plans for county jail, public library, city hospital, schools, etc., to cost \$7,939,000. Will vote on bonds Sept. 29th.
 Santa Monica, Cal.—A new library is being considered.
 Savannah, Ga.—Plans for a city hall to cost \$150,000 are ready.
 Seattle, Wash.—Bonds to the amount of \$400,000 have been issued for schools.
 Springfield, O.—A new city prison is recommended.
 Texarkana, Tex.—A \$150,000 public school will be erected.
 Waco, Tex.—Five schools are being planned.
 Walter, O. T.—\$5,500 in bonds have been voted for a school. The Mayor.
 Wartburg, Tenn.—A new court house will be erected.
 Yonkers, N. Y.—May possibly place a new city hall in Washington Park.
 Youngstown, O.—A new jail is contemplated for this place.

CONTRACTS AWARDED

Annapolis, Md.—Contract has been let for the annex to the courthouse to the B. F. Smith Fireproof Construction Co. Contract let for the erection of a chapel and officers' quarters at Naval Academy to the Noel Construction Co. of Baltimore, Md., for \$689,430.
 Atlanta, Ga.—Contract let for a post office station at Atlanta, to Griffin & Fitts, at \$23,000.
 Beaumont, Tex.—Contract for a new city hall has been let William Weber. The contract for the \$65,000 high school has been let Glenn Allen.
 Bozeman, Mont.—Contract let the Art Metal Construction Company, Jamestown, N. Y., for metallic shelves for the vaults of the court house.
 Cambridge, Mass.—The contract for the Elm street school has been let J. Lacotelli & Co., Boston, at \$70,000.
 Cleveland, O.—The contract for a public building has been let William Bradley & Son, 277 Broadway, N. Y., at \$1,049,000.
 Cordele, Ga.—Contract for the erection of Carnegie library has been let J. M. Baggett & Co., Douglassville, Ga., at \$9,500.
 Cumby, Tex.—George Wilson, of Sulphur Springs, Tex., has been awarded the contract for a school at \$7,000.
 Farmersville, La.—Contract for a court house has been let M. T. Lewman & Co., of New Orleans, at \$27,671.
 Greensburg, Pa.—William Miller & Sons have been awarded the contract for a court house at \$878,000.
 Iola, Kan.—The contract for a new court house has been let O. Swanson, of Topeka, for \$43,885.
 Lewiston, Idaho.—The contract for the Carnegie library has been awarded Galbraith & Jones, Spokane.
 Marquette, Mich.—The contract for a library has been let W. H. Maxwell, of Port Huron, at \$35,000.
 Marshall, Minn.—Contract for the Carnegie library has been let H. P. Fulton at \$9,400.
 Monticello, Ill.—The contract for a court house has been let H. B. Walters, Danville, at \$64,480.
 Monticello, Ia.—The contract for a library has been let E. M. Loope, Hopkinton, at \$10,000.
 Norwich, Conn.—The contract for the post office has been let Buckley Const. Co., Plattsburg, N. Y., at \$75,769.
 Pensacola, Fla.—The contract for a three-story building for the Pensacola Classic School has been let C. H. Turner, at \$7,000.
 Pomona, Cal.—The contract for a high school has been let Henry Hanson & Co. at \$39,975.
 Port Gibson, Miss.—The contract for a court house for Claiborne County has been let M. T. Lewman & Co., Louisville, Ky., at \$22,970.
 Stillwater, Minn.—The contract for a post office has been let J. W. Miller, 526 Race street, St. Paul, Minn., at \$42,000.
 Sycamore, Ill.—The contract for the DeKalb County court house has been awarded to W. J. McAlpin, Dixon, at \$137,964.
 Trenton, Mo.—The contract for a court house has been let John H. Sparks, St. Joseph, at \$60,000.

(Continued on page 31.)

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WATER-SUPPLY. Considered from a sanitary standpoint. Wm. P. Mason. 500 pp., illus. \$4.00. w.
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PUBLIC WATER-SUPPLIES. Requirements, resources and construction of works. F. E. Turneure and H. L. Russell; with a chapter on pumping machinery by D. W. Mead. 733 pp., illus. \$5.00. w.
MICROSCOPY OF DRINKING WATER. Methods of examination of and organisms found in water. George C. Whipple. 338 pp., illus. \$3.50. w.
SEWERAGE. Design, construction and maintenance of sewer systems. A. Prescott Folwell. (English.) 445 pp., illus. \$3.00. w.
MUNICIPAL IMPROVEMENTS. Manual of the methods, utility and cost of public improvements. W. F. Goodhue. 207 pp., illus. \$1.75. w.
ECONOMIC DISPOSAL OF TOWNS' REFUSE. W. F. Goodrich. (English.) 340 pp., illus. \$3.50. w.
SEWAGE DISPOSAL. Methods of disposal and purification. Wyncoop Kiersted. 182 pp. \$1.25. w.
SEWER DESIGN. Treatise on sewer construction. H. N. Ogden. 234 pp., illus. \$2.00. w.
WATER-SUPPLY ENGINEERING. Design, construction and maintenance of water-supply systems, both city and irrigation. A. Prescott Folwell. 562 pp., illus. \$4.00. w.
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FILTRATION OF PUBLIC WATER-SUPPLY. Construction and operation of rapid and slow filters and treatment of waters. Allen Hazen. 321 pp., illus. \$3.00. w.
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HIGHWAY CONSTRUCTION. Treatise on construction and maintenance of roads, streets and pavements. A. T. Byrne. 895 pp., illus. \$5.00. w.
TEXT-BOOK ON ROADS AND PAVEMENTS. Country roads and city streets. F. P. Spalding. 213 pp., illus. \$2.00. w.
STREET PAVEMENTS AND PAVING MATERIALS. Methods and materials of city street construction. George W. Tillson. 496 pp., illus. \$4.00. w.
SEWERS AND DRAINS FOR POPULOUS DISTRICTS. Rules and formulas for dimensions and construction. J. W. Adams. \$2.50. v.
PURIFICATION OF SEWAGE. Scientific principles of sewage purification and their application. Sidney Barwise. (English.) Illus. \$2.00. v.
BACTERIAL PURIFICATION OF SEWAGE. Modern biological methods of purification. Sidney Barwise. (English.) Illus. \$2.50 net. v.
CLEANING AND SEWERAGE OF CITIES. Translated from the German. R. Baumeister. Illus. \$2.00. v.
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Waco, Tex.—Peter Harris has been awarded the contract for the McLennan County jail at \$24,991. The contract for a federal building has been let F. L. Stevenson, Dallas, at \$73,900.

Waterbury, Conn.—The contract for a post office has been awarded Fissell & Wagner, St. James Bldg., New York, at \$76,223.

Windsor, N. C.—D. K. Cecil & Co. have been awarded the contract for the jail at \$75,000.

Yankton, S. D.—The contract for a court house has been let W. P. Rowles, Turin, Ind., at \$60,000.

WATER SUPPLY

Ada, Ind. Ter.—\$45,000 will be spent for water works at this place.

Alexandria Bay, N. Y.—Plans for water works and sewers are ready. The cost of same is estimated at \$70,000.

Alfred, N. Y.—Water works for this place are being considered. Village Clerk.

Algoma, Wash.—Water works are being considered here.

Alliance, Pa.—The installation of water works is contemplated.

Anthon, Ia.—\$4,500 in bonds will be issued for water works.

Attleboro, Mass.—\$20,000 has been voted by the citizens of this place for extending the service. Comr. W. M. Stone.

Baton Rouge, La.—Water works are being considered here.

Battle Creek, Mich.—Tests will be made for a driven well supply. Board Public Works.

Beatrice, Neb.—Water works are being discussed here.

Belding, Mich.—The issue of bonds for water works has been voted down.

Bethlehem, N. H.—It has been voted to buy the local water works.

Big Timber, Mont.—Water works for this place are being considered. Mayor J. F. Ashbridge.

Bordentown, N. J.—The city will buy the plant of the Water Company.

Bourbonnais, Ill.—Water works will be built here.

Bristol, S. D.—May install air pressure system water works.

Brunswick, Me.—Test wells sunk and water works will probably be installed. Town Clerk.

Center Ossipee, N. H.—Surveying for water works at a cost of \$20,000.

Chenoa, Ill.—Water works for this place are under consideration.

Chicago, Ill.—This place is contemplating the use of meters to cut down water waste. Mayor Harrison.

Clearlake, S. D.—This place will bond for municipal water works.

Corunna, Mich.—Water works are contemplated.

Crete, Ill.—Municipal water works will be installed.

Cudahy, Wis.—\$30,000 will be expended for water works and sewer system. Damascus, Syria.—The Governor-General of Syria wants bids for cast-iron pipe for water works fourteen miles from city—9.8 in. pipe for conduits and 1.18 inch distribution pipes. Address the Governor.

Delta, Colo.—Water works for this place are contemplated.

Detroit, Mich.—An issue of \$500,000 in bonds to improve the water works is probable.

Essexville, Mich.—Water works and paving at a cost of \$50,000 are contemplated.

Fayetteville, Ark.—The water works, which were purchased, will be improved. J. H. McIlroy.

Forrestport, N. Y.—Water works to cost \$23,000 are to be installed here.

F. J. Wagner, Engineer.

Ft. Casey, Wash.—Plans for \$100,000 water works are being made.

Fortuna, Cal.—Water works are contemplated here.

Frankford, Ind.—As the franchise of the Water Company expires in 1906, the Council has begun to debate the question of renewal or of building new works.

Gloucester, City, N. J.—A filtration plant may be built here.

Hamlin, Ia.—Water works are being considered.

Hawesville, Ky.—Water works are being considered.

Homestead, Pa.—This place is considering the adoption of a meter system. City Clerk.

Hotchkiss, Colo.—\$35,00 in bonds has been voted for water works.

Hydepark, Vt.—This place is considering the installation of water works.

F. R. McFarland.

Indianapolis, Ind.—A filtration plant may be built.

Julietta, Idaho.—A franchise for water works has been let D. T. A. Makintosh.

Kansas City, Mo.—It is probable that all water consumers may be compelled to install meters.

Kingville, Ont.—\$10,000 will be spent on extending the water works.

Lancaster, Ky.—New water works will be built. The Mayor.

Lincoln, Ill.—\$50,000 will be spent for new water works at this place.

Lone Tree, Ia.—A test well will be sunk for the contemplated water works. Mayor Riggs.

Mannville, N. Y.—The vote on the question of water works recently taken resulted against the proposition.

Marysville, Cal.—Water works are being contemplated.

Meredasia, Ill.—Water works for this place are contemplated.

Miamessburg, O.—City water works are contemplated.

New York, N. Y.—Improvements in the water works to cost nearly \$2,000,000 have been approved, including filter beds, mains, pumps, etc. Comr. Monroe.

N. Sydney, N. B.—The pumping station will be enlarged.

Oconto, Wis.—It is possible that this place will vote to buy water works.

Okmulgee, Ind. Ter.—Water works and sewer system will be built. Burns & McDonnell, Engineers, Kansas City, Mo.

(Continued on page 32.)

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Orleans, Ind.—Municipal water works are under consideration.
 Oxford, Mass.—Water works for this place are contemplated.
 Parkersburg, W. Va.—A plan for purifying the water is being considered.
 City Engineer Dunbar.
 Passaic, N. J.—An November 3rd the city will vote on the question of municipal water works.
 Perry, Ok. Ter.—This place may buy the local water works for \$25,000.
 Piper City, Ill.—Water works may be installed here.
 Port Angeles, Wash.—Municipal water works are being considered.
 Provo, Utah.—Will improve the water works at a cost of \$40,000.
 Rainer, Ore.—A franchise for water works and an electric plant has been let D. H. Welch, Astoria.
 Richmond, Va.—Bids are wanted Sept. 1st for settling basins to cost \$300,000. Water Works Supt. Bolling.
 Rutherford, N. J.—A municipal water works system is under consideration.
 St. Johns, Ore.—A franchise for water works has been let J. C. Scott.
 San Bernardino, Cal.—Plans are being made for a municipal plant.
 San Francisco, Cal.—It is probable that a vote will be taken on the question of a municipal water supply from the Tuolumne river.
 San Pedro, Cal.—Water works are being considered.
 Seneca Falls, N. Y.—A franchise has been let the Cayuga Lake Water Supply Co. for water works.
 Shellsburg, Ia.—Water works will be installed here.
 Shippensburg, Pa.—A reservoir and larger mains are being planned.
 Springfield, O.—This place may buy a pumping engine of 10,000,000 gallons capacity. Board Public Service.
 Summit, Idaho.—The installation of water works is being considered. City Clerk.
 Tawas City, Mich.—This place is contemplating water works and electric light plant.
 The Dalles, Ore.—The water works will be extended, for which \$50,000 has been voted. Water Commissioners.
 Tishomingo, Ind. Ter.—Water works will be installed at a cost of \$30,000. The Mayor.
 Tupelo, Miss.—\$60,000 in bonds will be issued for water works and sewers.
 Vidalia, La.—This place may install water works and an electric plant. Mayor Campbell.
 Wakefield, Mass.—It is probable that the plant of the Wakefield Water Company will be purchased at \$250,000.
 Walsenburg, Colo.—This place will put in water works to cost \$60,000. City Clerk H. M. Setter.
 Warwick, N. Y.—\$23,000 will be spent on new mains.
 W. Allis, Wis.—Water works are being considered.
 Youngstown, O.—Will probaly erect a standpipe for fire protection in east end.
 Yutan, Neb.—The question of water works is being considered.

CONTRACTS AWARDED

Alexandria Bay, N. Y.—William H. Cookman, Niagara Falls, has been awarded the contract for water works at \$80,000.
 Aurora, Ill.—The John S. Cole Company, of Chicago, has received the contract for the water works of the Aurora Water Company.
 Berlin, Pa.—The contract for water works for the Berlin Water Company has been let Chandler Bros. Co., Beaver Falls, at \$50,000.
 Blackwell, Okla. Ter.—The contract for sinking artesian wells has been let the Backwell Gas & Mining Co.
 Bridgewater, S. D.—The contract for water works has been let J. Thompson & Sons Mfg. Co., Beloit, Wis., at \$15,000.
 Bristol, Va.—The contract for reservoirs has been awarded Caldwell & Jackson at \$12,000.
 Coopersburg, Va.—The contract for water works has been let Crilby & Rathbun.
 Cumberland, Wyo.—The contract has been let Coney Bros. Const. Co., Ogden, Utah, for excavating for the water works.
 Dallas, Ore.—The contract for water works has been let H. V. Gates, Hillsboro, Ore. Mayor Hayter.
 Davenport, Wash.—The contract for extending the water mains has been let V. Schroeder.
 Doylestown, Pa.—The contract for a new boiler for the water works has been let the Lebanon Boiler Works.
 Elizabeth, Ill.—The contract for water works has been let John Healy, Chicago.
 Etna, Pa.—Gordon & Hulling, of Pittsburg, have been awarded the contract for improving the water works.
 Great Falls, Mont.—The contract for water mains has been let H. A. Shepherd at \$6,140.
 Groton, Conn.—Contract for 54 hydrants has been let the Groton Water Co. at \$35 per hydrant, yearly.
 Kiesta, Minn.—The contract for works has been let the Des Moines Bridge & Iron Works Co. at \$5,920.
 La Veta, Colo.—The contract for water works has been let Mitchell Engr. & Building Co., Denver, at \$17,000.
 Lawrenceburg, Ky.—The contract for sinking artesian wells has been awarded J. F. Ryerson, of Salvisa, Ky.
 Maxwell, Ia.—The Des Moines Bridge & Iron Works has received the contract for repairs to the water works at \$2,840.
 Oceanside, Cal.—The contract for wood pipe has been awarded the National Wood Pipe Company, of San Francisco, at \$10,380. The contract for reservoirs has been let W. H. Simmons, at \$1,493.

(Continued on page 33.)

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Palo Alto, Cal.—The contract for water works extension has been let the Crane Company for material.

Reed City, Mich.—The contract for a duplex steam pump has been let the Gardner Governor Company, Quincy, Ill.

Salem, Va.—The contract for new mains has been awarded the Salem Heating Co.

Sanford, Me.—The contract for supplying water has been awarded the Sanford Light & Water Company.

Shediac, N. B.—The contract for village water works has been let the Maritime Constr. Co., Charlottetown, P. E. I., for \$7,900.

So. Deerfield, Mass.—The contract for laying water pipe has been let Peter Barbour.

Spokane, Wash.—The contract for a standpipe has been let the Puget Sound Bridge & Dredging Co.

Sterling, Colo.—The contract for water works has been let J. E. Hurd, Pueblo, Colo.

Yonkers, N. Y.—The contract for enlarging the reservoir has been let Murray, Malloy & Berrigu at \$56,788.

FIRE APPARATUS.

Bass Rocks, Mass.—The citizens of this place desire protection from fire.

Chattanooga, Tenn.—Sherman Heights will form a volunteer company.

Cooper, Tex.—This city has voted to issue \$1,500 in bonds to purchase a fire engine.

Des Moines, Ia.—A petition asks a fire station on 27th street.

Elgin, Ill.—A fire alarm system will be installed at this place. Chief Geddes.

Girardsville, N. J.—A fire company was recently formed. Burgess McNally.

Houston, Tex.—A central station will be erected at a cost of \$100,000.

Kewanee, Ill.—A paid department is to be established.

Los Angeles, Cal.—The expenditure of \$7,000 for the purchase of a water tower has been recommended by the fire commissioners.

Lynbrook, L. I., N. Y.—The Lynbrook Fire Department has been organized. Walter M. Pratt.

Milroy, Ind.—A company has been formed here. Frank Hillis, Capt.

Milwaukee, Wis.—\$70,000 will be borrowed for the purpose of building and equipping two new stations. City Clerk.

New Haven, Conn.—A site for a new engine house has been purchased.

(Concluded on page 34.)

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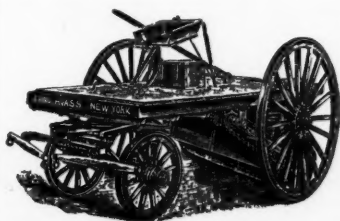
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North Bergen, N. J.—A new fire company will be formed. Township Att'y Walschied.

Oakland, Cal.—Steamer, truck and combined chemical and hose wagon needed. Chief Krauth.

Oceanport, N. J.—A hose company may be organized here. A. C. Bennett. Olean, N. Y.—5,000 feet of hose are needed.

Orange, N. J.—A new fire station on Forrest street is under consideration.

Portsmouth, Va.—The Council recommended the expenditure of \$9,500 for fire apparatus, to include an engine, at \$4,500, two combination chemical and hose wagons at \$2,000 each.

Sandusky, O.—A new engine house is under consideration. Bd. Pub. Safety.

Shelbyville, Ky.—Extensive improvements in the fire department are contemplated.

Sherman Heights, Tenn.—A volunteer company will be formed.

Spinal, Minn.—The fire department needs a \$20,000 appropriation for apparatus and houses.

Swissvale, Pa.—Two fire companies will be formed.

Sylvania, O.—A volunteer department has been organized. Chief Wellman.

MISCELLANEOUS

Canandaigua, N. Y.—All wires on Main street have been ordered underground.

Chicago, Ill.—Methods of garbage disposal are being considered by a special committee.

Elwood, Ind.—Bonds for a garbage reduction plant may be issued.

Ft. Worth, Tex.—A garbage chemoctory will probably be erected. Mayor Powell.

Geneva, O.—Baldwin Brothers & Graham have been awarded the contract for sewer system and disposal plant at \$22,636.

Glenville, O.—A municipal garbage plant may be erected.

Grand Rapids, Mich.—The question of garbage disposal is being considered. The contract for collecting and disposing of garbage, etc., has been let Edgar S. Keifer, for 3½ years.

Harrisburg, Pa.—The citizens have donated land for parks on river. Sanitary authorities are considering plans for the removal of garbage.

Jackson, Mich.—A sewage purification plant will be built.

Kalamazoo, Mich.—It was reported that bids were to be received on Aug. 6 for a sewage pumping and purification plant. George S. Pierson, Engr.

Lakewood, O.—\$35,000 in bonds will be issued for the construction of sewers and sewage disposal works. H. J. Sensel, Village Clerk.

McKeesport, Pa.—The garbage plant has been sold and a new one will be erected. Secretary, Board of Health.

Manchester, Conn.—Surveying for a proposed sewer system. A disposal plant will be installed.

Milwaukee, Wis.—Three garbage plants have been recommended by Secretary Schultz, Health Department.

Montreal, Que.—\$5,000,000 will be spent on conduits. Engr. C. E. Phelps, City Hall, Baltimore, Md.

Natchez, Miss.—Garbage disposal is being considered.

Oxford, O.—Sewers and a purification plant will be installed. Engr. E. F. Layman, 32 E. 23d street, Cincinnati.

Portland, Ore.—The garbage crematory may be enlarged.

Pueblo, Colo.—The question of the disposal of garbage is under consideration.

St. Joseph, Mo.—The disposal of garbage is being considered by Mayor Borden.

St. Louis, Mo.—The question of a garbage plant will be looked into by the Board of Public Improvement.

St. Paul, Minn.—Sewage disposal is contemplated. City Engr. Rundlett.

San Francisco, Cal.—Playgrounds and parks to cost over \$2,000,000 are contemplated. A vote on a bond issue will be taken in September. Board Public Works.

Spokane, Wash.—The Decarie Cemetery Co., Minneapolis, has received the contract for the city crematory.

York, Pa.—A sewer system and disposal plant to cost \$400,000 will probably be built.

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